

# City-zen Nicosia Roadshow (May 8-15 2019)



Presentation by

**Prof.Dr. Craig Lee Martin**

City-zen Roadshow Leader

The Delft University of Technology (NL)  
The Grenfell-Baines Institute of Architecture, UCLan (UK)

## Roadshow Team:

Prof. Greg Keeffe (QUB)  
Prof.Dr. Andy vd Dobbelsteen (TUD)  
Dr. Riccardo Pulselli (UoS)  
Prof.Dr. Craig L.Martin (TU Delft / UCLan)  
Prof.Dr. Han Vandevyvere (VITO)  
Dr. Andy Jenkins (QUB)  
Dr. Markella Menikou (UoN)  
Anneleen Vanderlinden (Th!nk-e)  
Achille Hannoset (Th!nk-e)  
Maryam Al-Irhayim (UCLan)  
Emma Campbell (QUB)  
Sam van Hooff (TU Delft)  
Rainer Townend (UCLan)  
Alexis Postekkis (UoN Alumni)  
Andreas Prokopiou (UoN Alumni)  
Christos Xenofontos (UoN Alumni)

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 608702



## FUN-SHOP - WALK

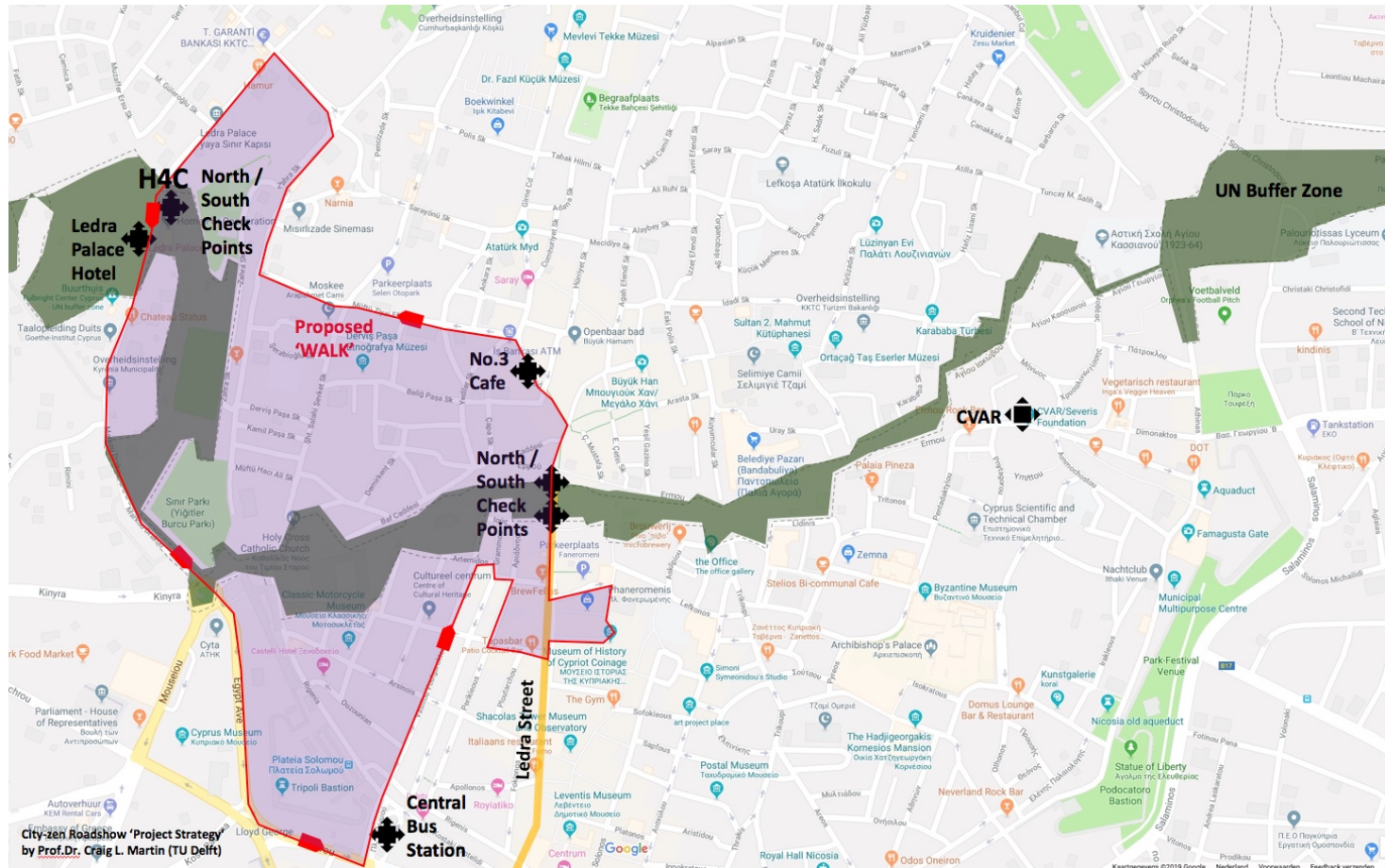


To place Citizens in heart of process to create a healthier, happier and energy efficient city.

To openly invite Nicosia's stakeholders to come and get involved no matter what background and expertise.



# FUN-SHOP - WALK



To place Citizens in heart of process to create a healthier, happier and energy efficient city.

To openly invite Nicosia's stakeholders to come and get involved no matter what background and expertise.





## FUN-SHOP - TALK



Global experts combine with local stakeholder passion, knowledge and close familiarity of place to reach zero energy.

To ensure that solutions stay with the people who helped create them.





## FUN-SHOP - TALK (DUTCH EMBASSY/RESIDENCE)



Embassy of the  
Kingdom of the Netherlands

- Sustainability event at the residence of the Dutch Ambassador

## FUN-SHOP - TALK (EMU DESIGN WEEK)



- 9<sup>th</sup> International EMU Design Week



Roadshow Event - The 9<sup>th</sup> International EMU Design Week, 08 May 2019 "in|dependence" held at the Eastern Mediterranean University (EMU), Faculty of Architecture, 08-10 May 2019, Famagusta, North Cyprus. Sustainability seminars would be delivered by Prof. Greg Keeffe on 'Biomimetic Design' and by Prof. Dr. Martin on 'The Roadshow' at the EMU.

City-zen Roadshow Leader – Prof.Dr. Craig Martin



Nicosia, Cyprus, May 2019



## FUN-SHOP - Go2Zero



City-zen Roadshow Leader — Prof.Dr. Craig Martin



- Energy Transition role playing game



Nicosia, Cyprus, May 2019



## FUN-SHOP - Go2Zero



- Energy Transition role playing game



City-zen Roadshow Leader – Prof.Dr. Craig Martin

Nicosia, Cyprus, May 2019

## FUN-SHOPS – DESIGN (URBAN & ENERGY)



- Studios for energy and urban design continued throughout the week in different locations.











I DON'T BELIEVE IN  
GLOBAL WARMING

GLOBAL WARMING  
IS A SCAM  
TO STEAL MONEY  
FROM THE POOR  
AND THE MIDDLE CLASS  
AND TO DESTROY THE  
EARTH



# CYPRUS GREENHOUSE GASES INVENTORY 2016

	<b>ELECTRICITY</b>	91% heavy oil 3% PV 4% Wind 1% biomass	<b>3197 kt CO<sub>2</sub>-eq</b>	<b>37.0 %</b>
	<b>HOUSING</b>	51% Diesel oil 6% Kerosene 23% LPG 15% Biomass 6% Charcoal	<b>570 kt CO<sub>2</sub>-eq</b>	<b>6.6 %</b>
	<b>TRANSPORT</b>		<b>1889 kt CO<sub>2</sub>-eq</b>	<b>21.9 %</b>
	<b>INDUSTRY</b>		<b>1901 kt CO<sub>2</sub>-eq</b>	<b>22.0 %</b>
	<b>AGRICULTURE</b>		<b>559 kt CO<sub>2</sub>-eq</b>	<b>6.5 %</b>
	<b>WASTE</b>	79% landfilled 9% organic 12% recycled	<b>466 kt CO<sub>2</sub>-eq</b>	<b>5.4 %</b>
	<b>WATER</b>		<b>49 kt CO<sub>2</sub>-eq</b>	<b>0.6 %</b>
	<b>CARBON UPTAKE</b>		<b>-168 kt CO<sub>2</sub>-eq</b>	<b>1.9%</b>



**8631**  
**kt CO<sub>2</sub>eq**



## CYPRUS

Area: 9251km<sup>2</sup>

Citizens: 864,200

Population South: 72%

Population North: 28%

2018 7th National Communication  
and 3rd Biennial report under the

UNFCCC of Cyprus

Department of Environment

Ministry of Agriculture, Rural  
Development and Environment

**Analysis:** Dr Riccardo Pulselli, INDACO2 / Università di Siena

**Nicosia**, Cyprus, May 2019

# CYPRUS GREENHOUSE GAS INVENTORY 2016

Cyprus area = **9251 km<sup>2</sup>**

**2%**

-12 km<sup>2</sup>

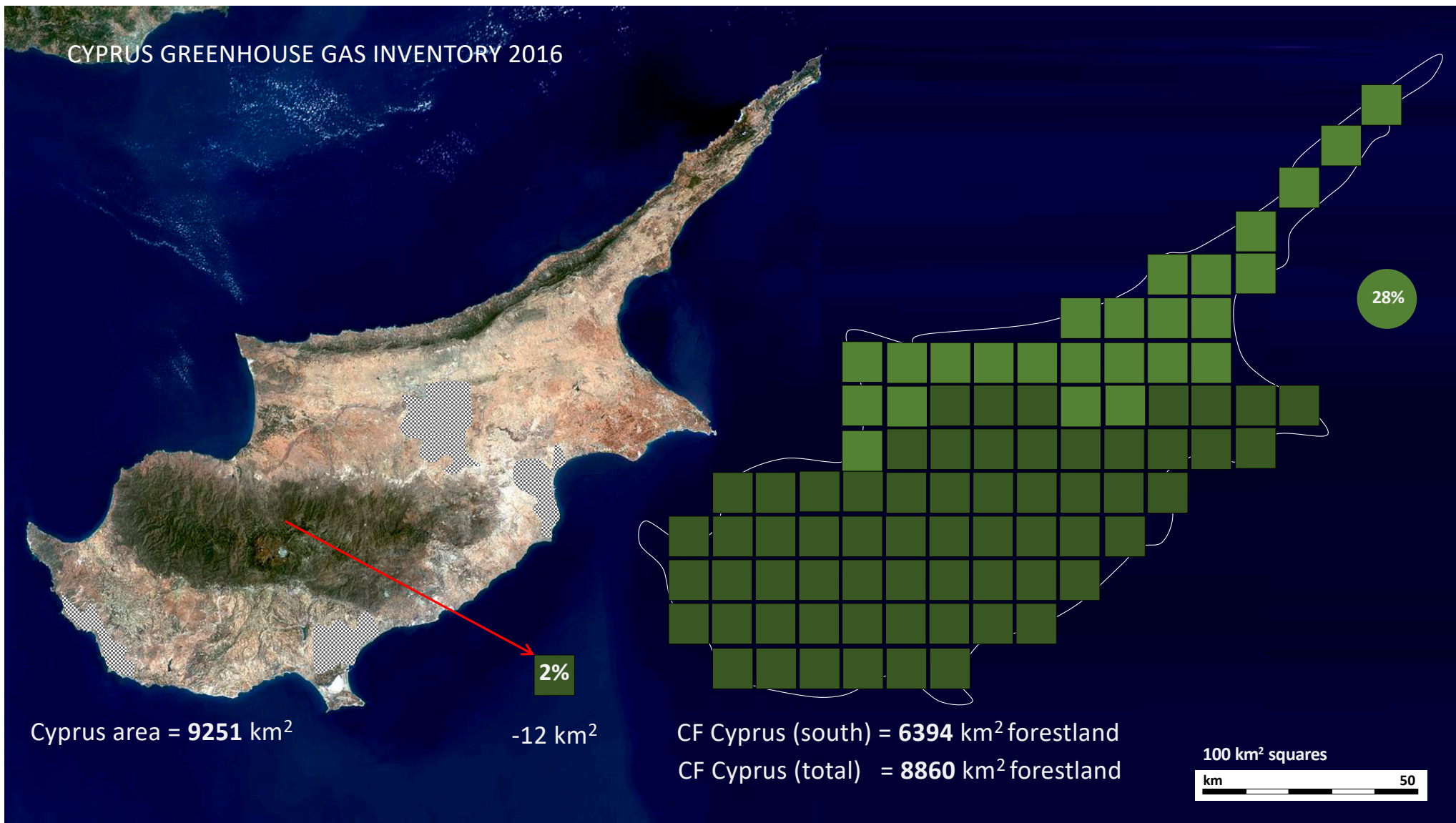
CF Cyprus (south) = **6394 km<sup>2</sup>** forestland

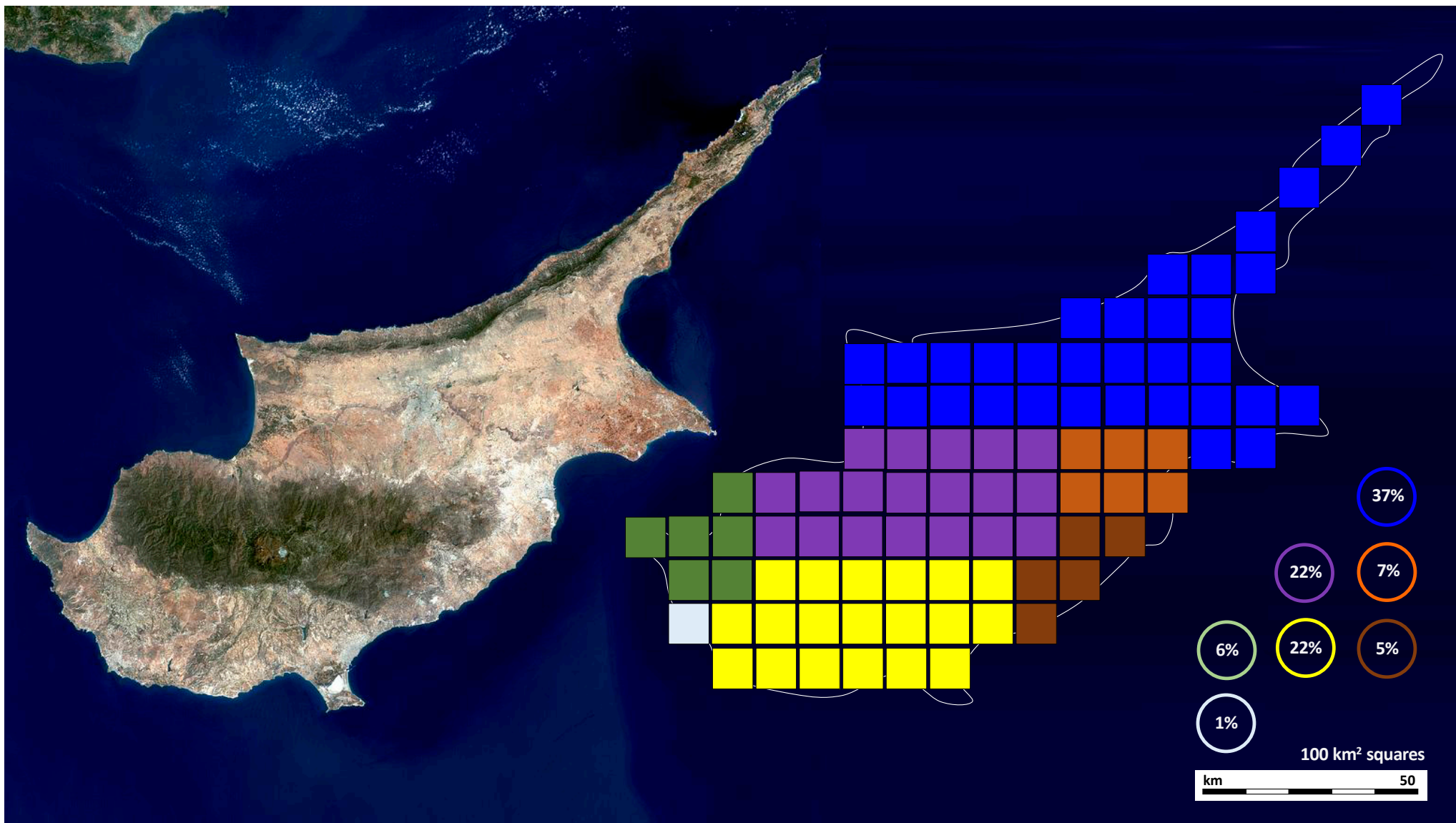
CF Cyprus (total) = **8860 km<sup>2</sup>** forestland

**28%**

100 km<sup>2</sup> squares

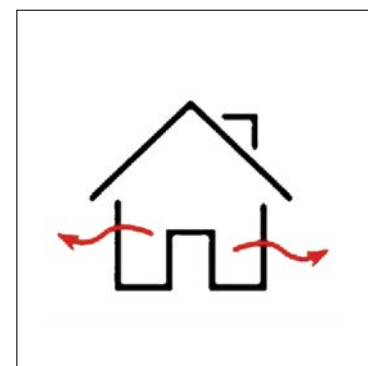
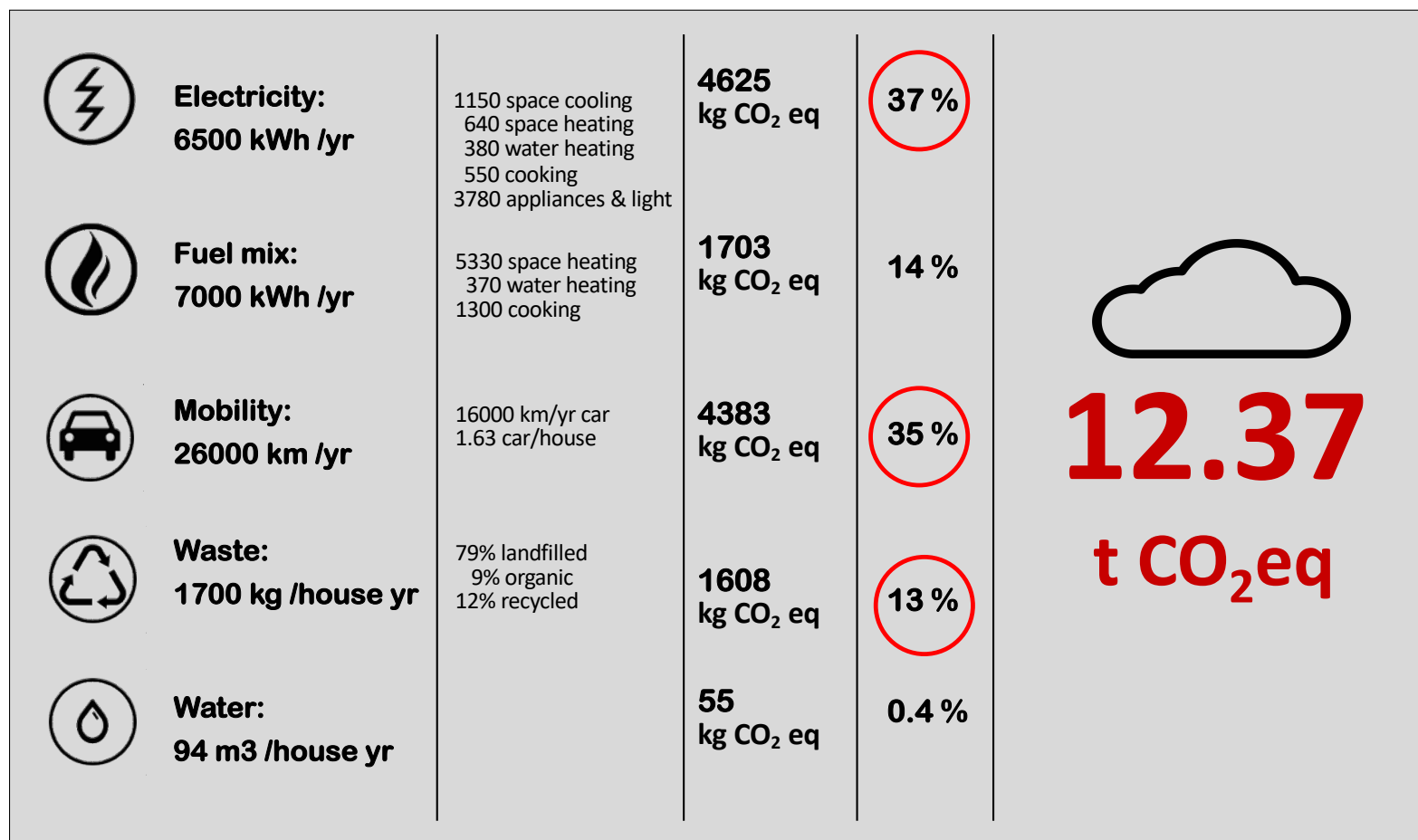
km 50







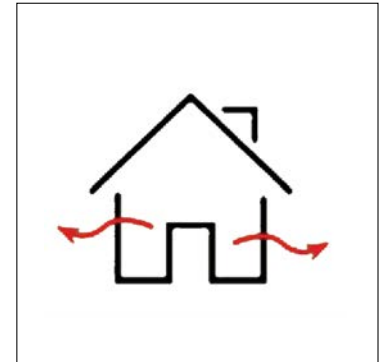
## Household profiling in Cyprus



**Household**  
2.7 citizens

Household 2009:  
[https://www.mof.gov.cy/mof/cystat/statistics.nsf/energy\\_environment\\_81main\\_en/energy\\_environment\\_81main\\_en?OpenForm&sub=1&sel=2](https://www.mof.gov.cy/mof/cystat/statistics.nsf/energy_environment_81main_en/energy_environment_81main_en?OpenForm&sub=1&sel=2)

## Carbon Footprint per household



### Household

2.7 citizens

12.37 t CO<sub>2</sub> eq

0.92 ha

Virtual forestland

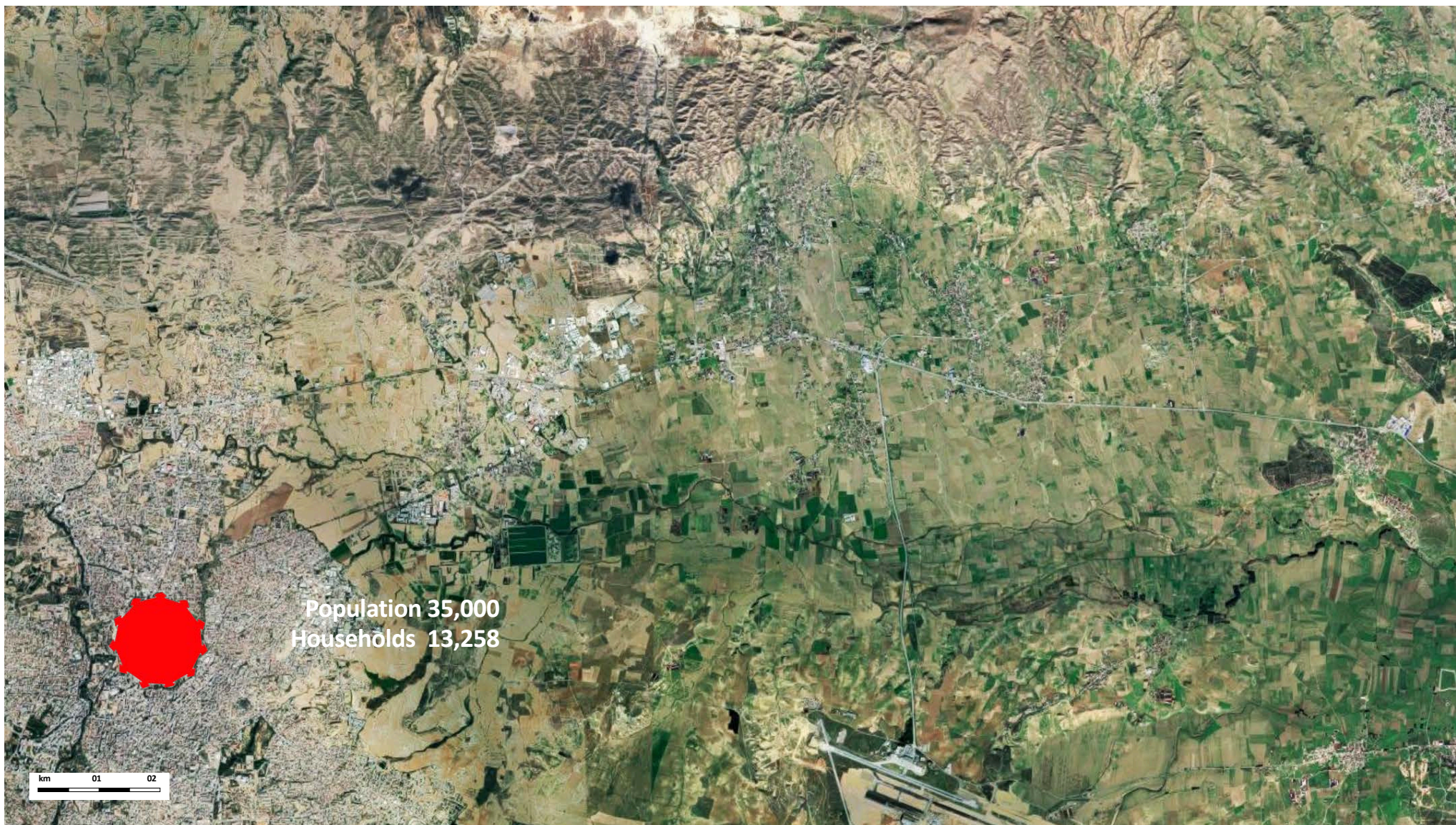
**1.5 fields**

Pulselli et al. "Carbon accounting framework for decarbonisation of European city neighbourhoods". Journal of Cleaner Production 208 (2018) 850-868.

**Analysis:** Dr Riccardo Pulselli, INDACO2 / Università di Siena

**Nicosia**, Cyprus, May 2019





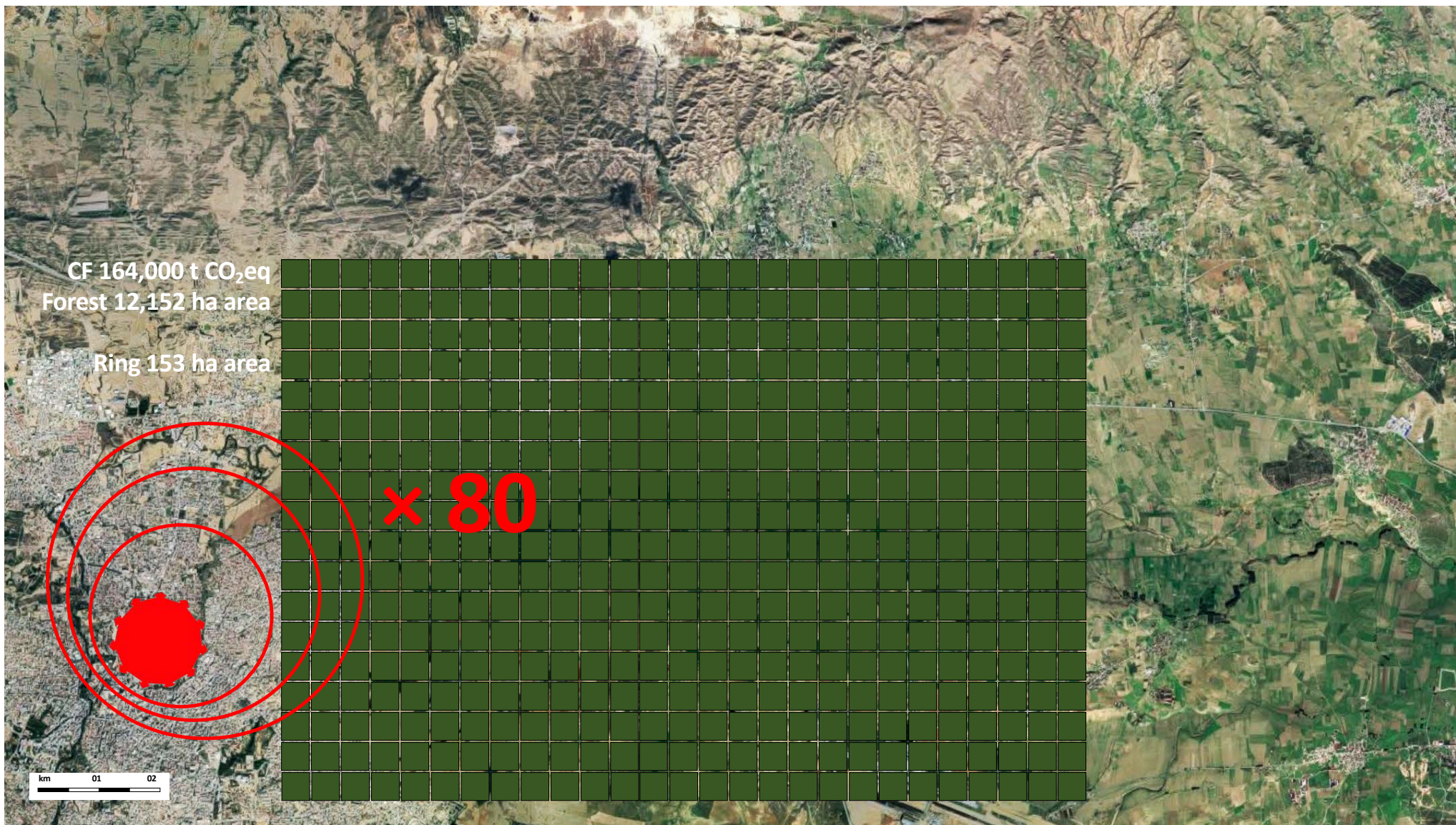


CF 164,000 t CO<sub>2</sub>eq  
Forest 12,152 ha area

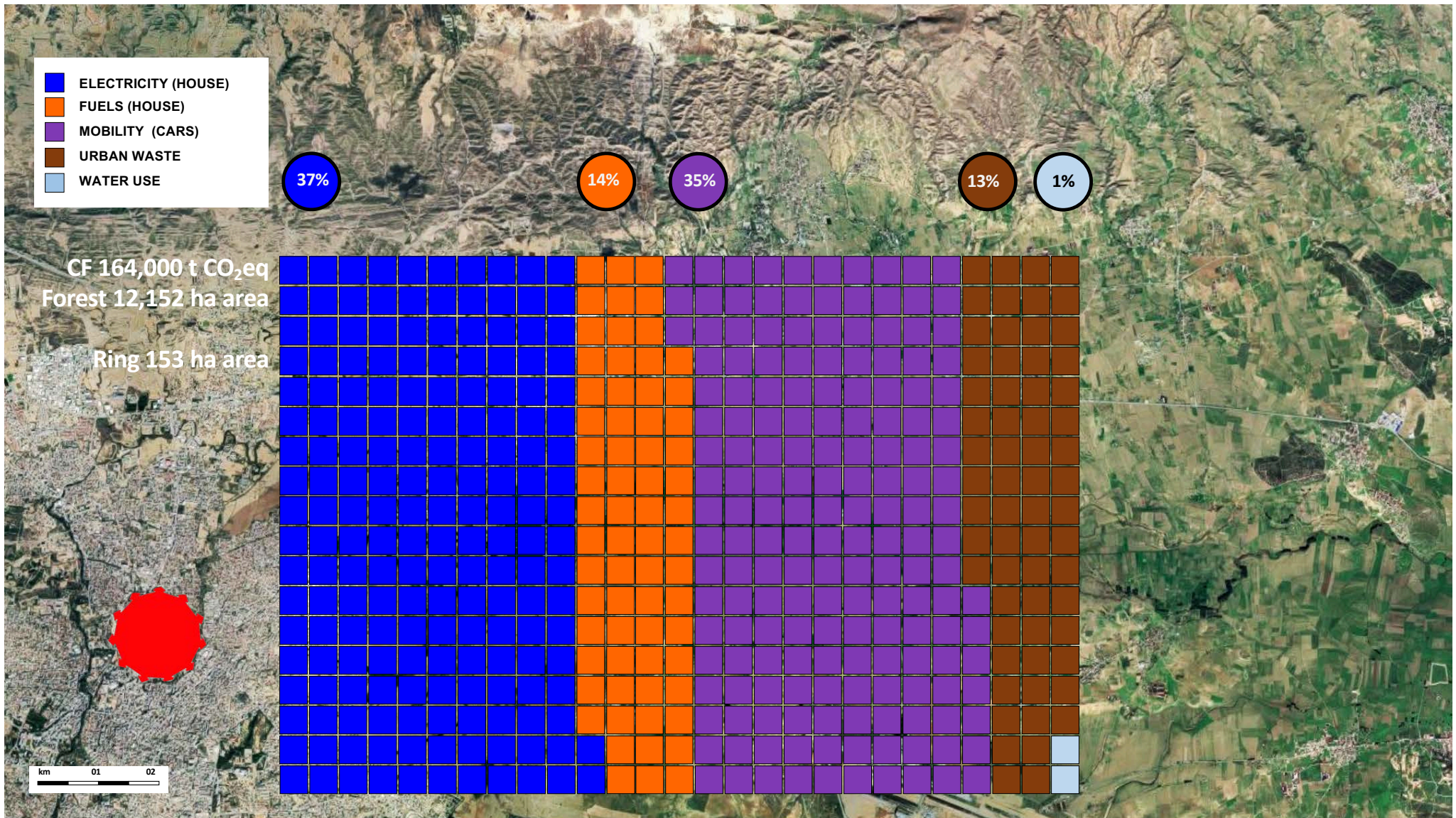
Ring 153 ha area

× 80

km 01 02





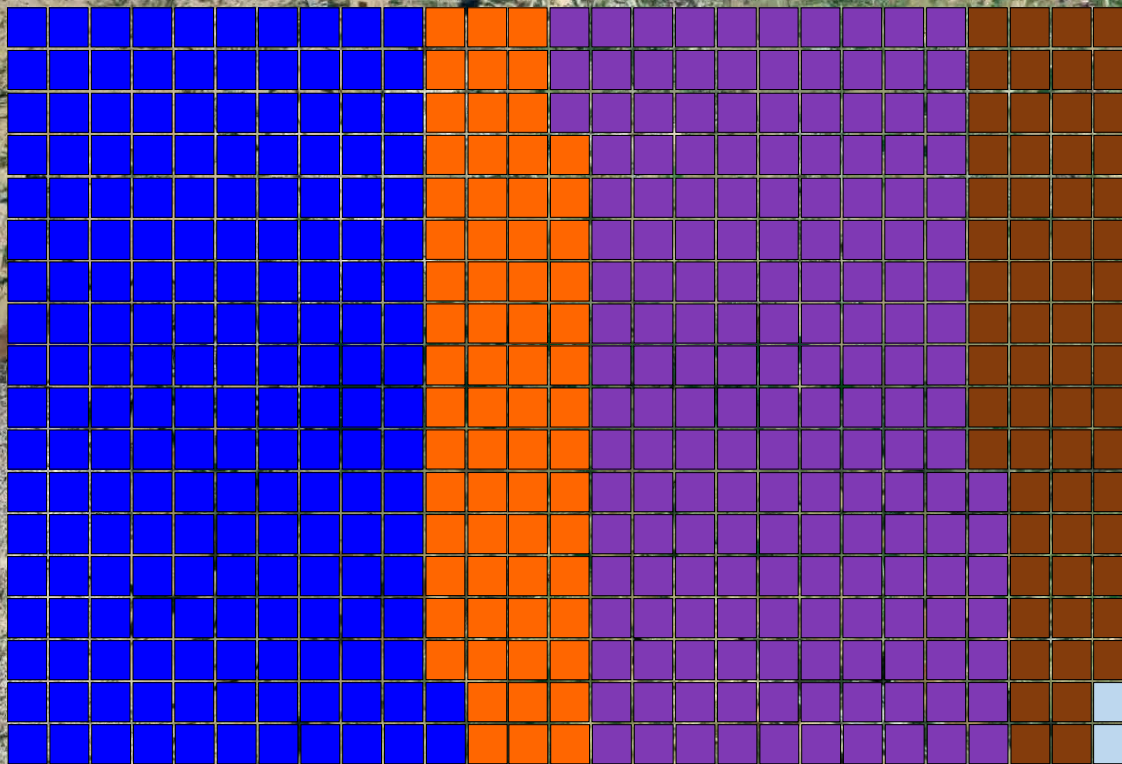




# What about food?

CF 164,000 t CO<sub>2</sub>eq  
Forest 12,152 ha area

Ring 153 ha area



km 01 02



# What about food?

+27%



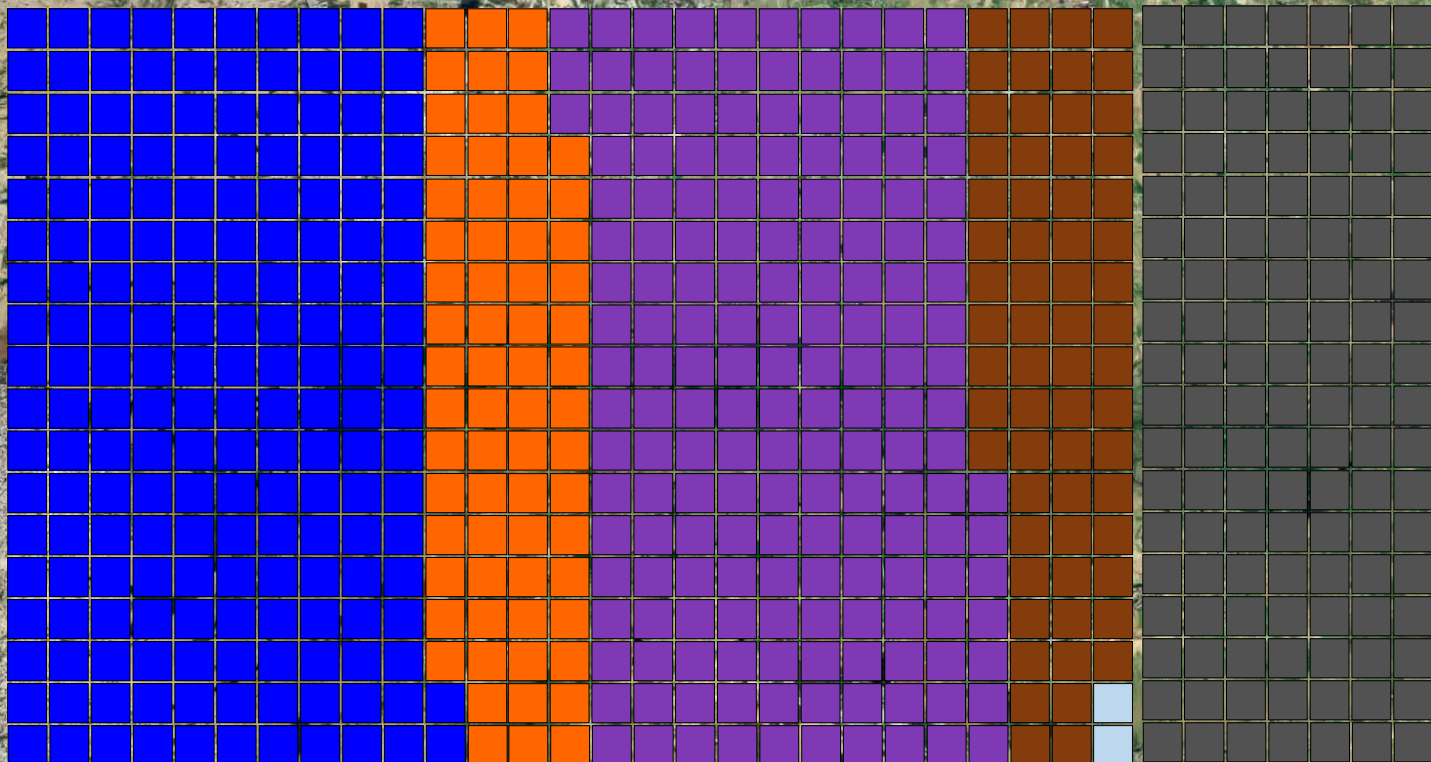
ADD CF 44,000 t CO<sub>2</sub>eq  
Forest 3280 ha area

Ring 153 ha area

× 21



km 01 02





# What about food?

+41%



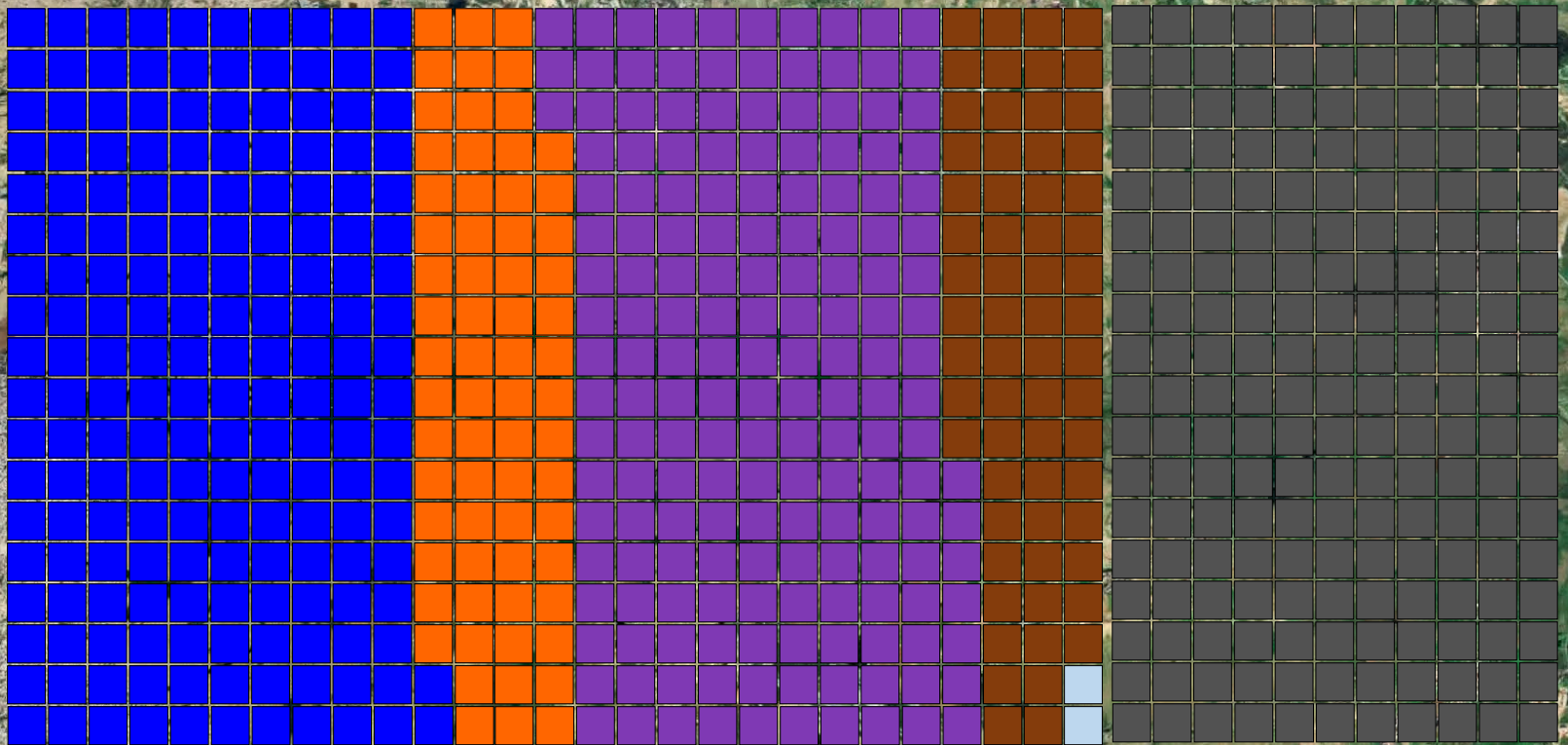
ADD CF 67,000 t CO<sub>2</sub>eq  
Forest 4982 ha area

Ring 153 ha area

**x 32**



km 01 02





# What about food?

+16%



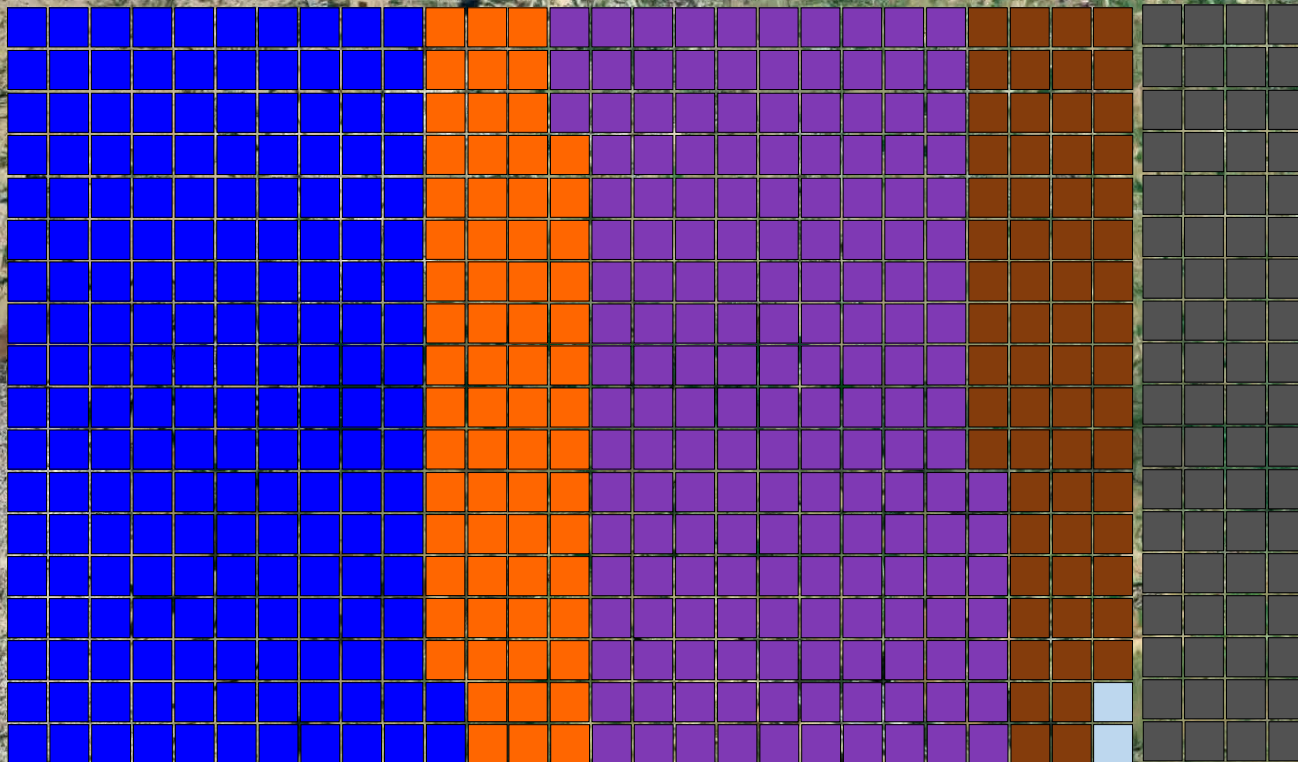
ADD CF 26,000 t CO<sub>2</sub>eq  
Forest 1944 ha area

Ring 153 ha area

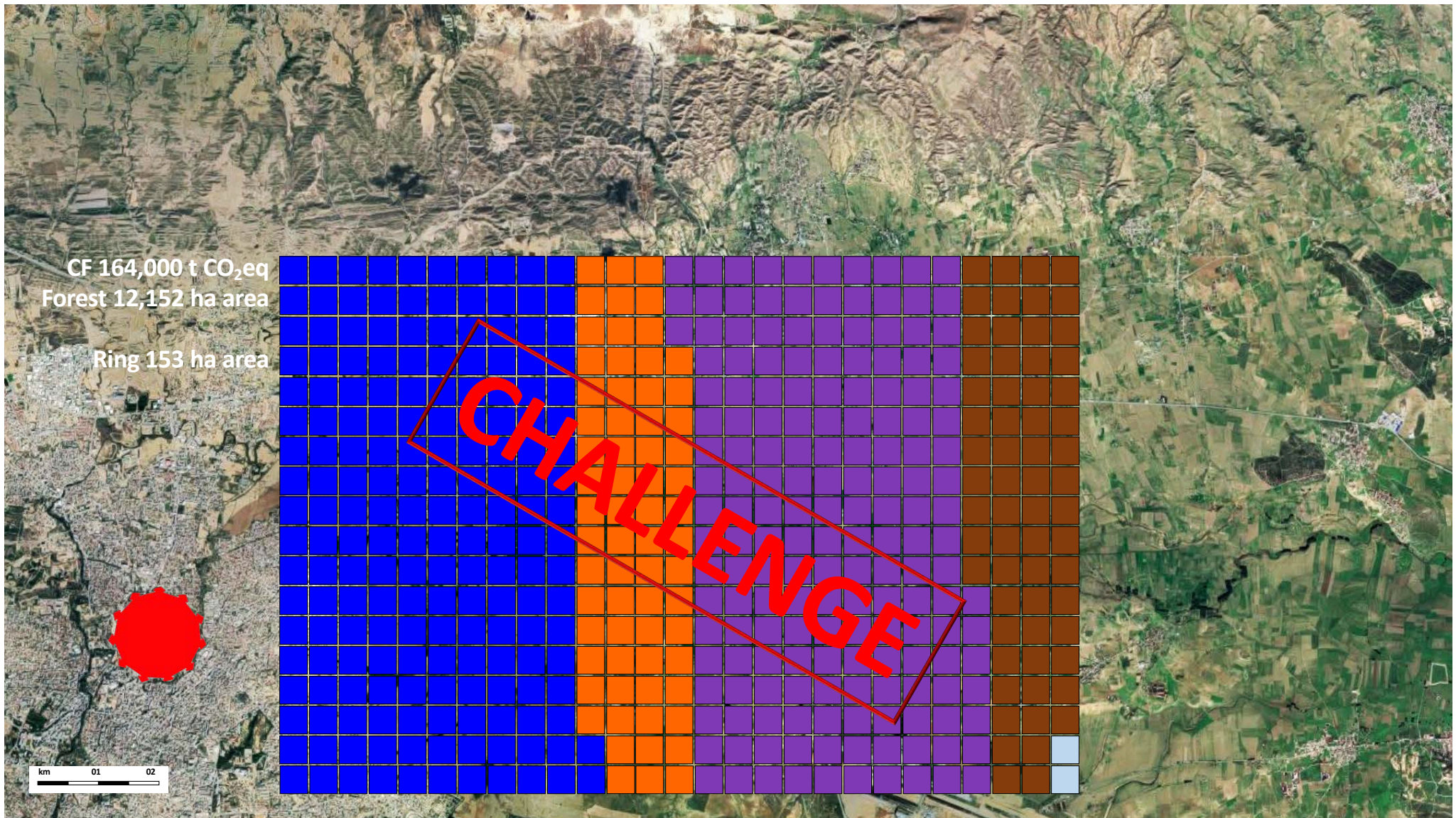
**x 12**



km 01 02







CF 164,000 t CO<sub>2</sub>eq  
Forest 12,152 ha area

Ring 153 ha area

CHALLENGE

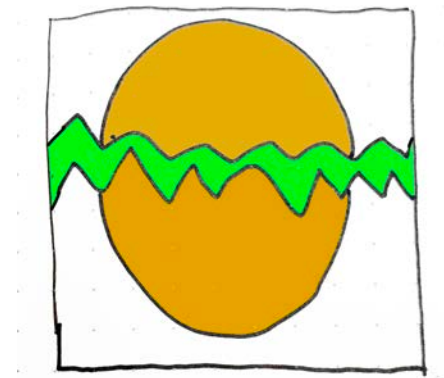
km 01 02



## Urban Design



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.



## Problems

Division

Not the biggest.....



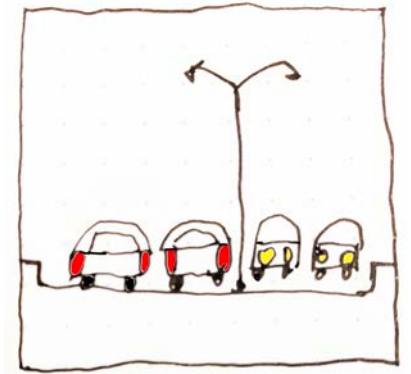
Nicosia, Cyprus. May 2019



## Urban Design



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.



### Problems

Car usage

Bigger...

Heat island

Climate change  
Sustainability



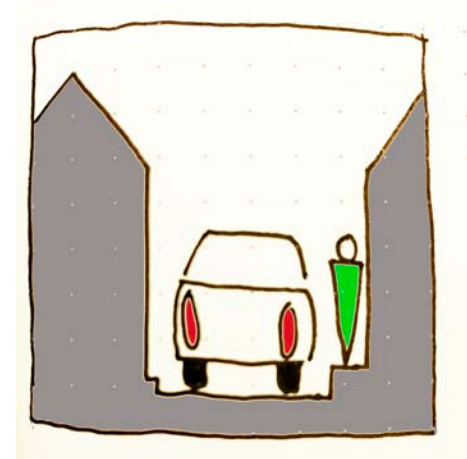
Nicosia, Cyprus. May 2019



## Urban Design



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



### Problems

People unfriendly  
space

Car dominated...

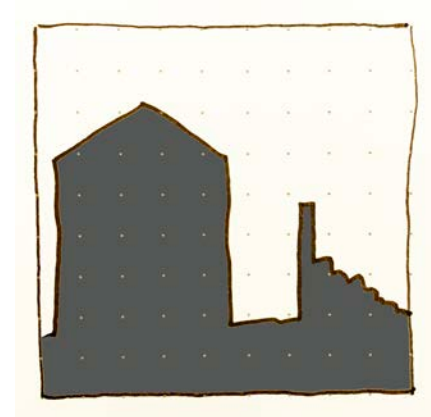


Nicosia, Cyprus. May 2019

## Urban Design



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



## Problems

Heritage at risk

The possibilities  
are endless.....



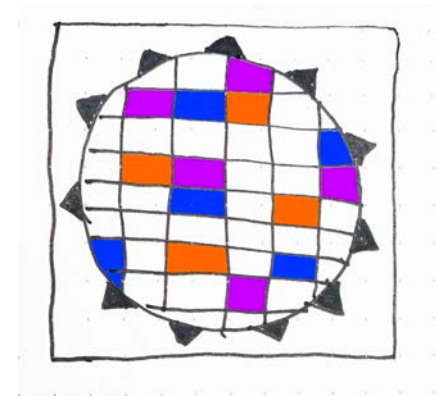
Nicosia, Cyprus. May 2019



## Urban Design



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



## Problems

No obvious centre  
public space in the  
city



Nicosia, Cyprus. May 2019

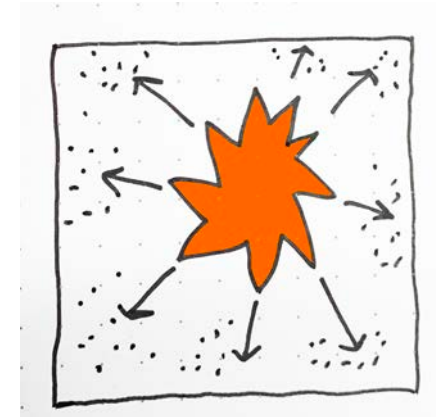
## Urban Design

Problems compounded by

Suburban growth



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.



### Problems

Suburban growth

No transport  
infrastructure

Car-based transit



Nicosia, Cyprus. May 2019

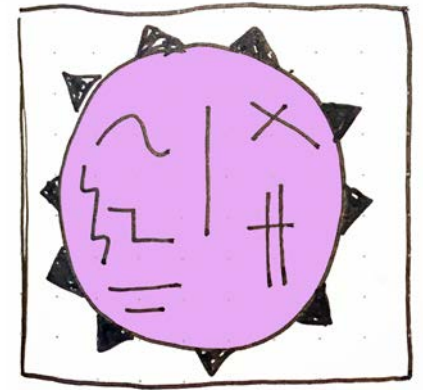
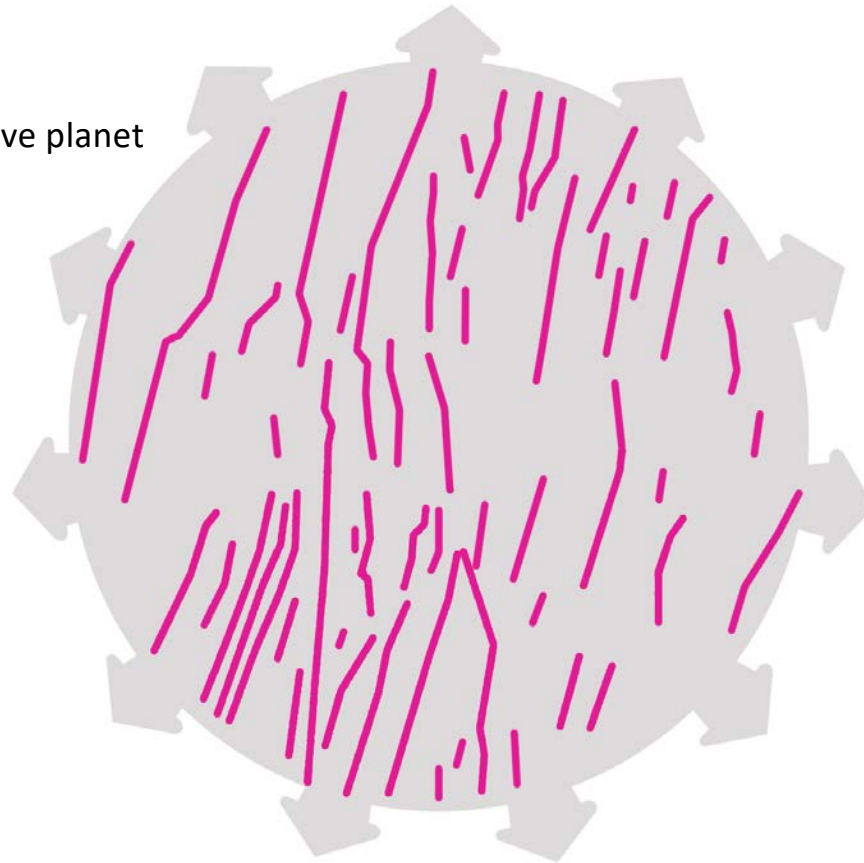


## Urban Design

Key Premise

Change space – change behavior – save planet

Network issues  
N-S



Network issues

Change space

Change behaviour

Save lives

Save planet

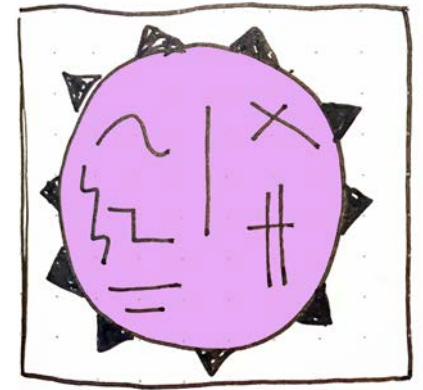
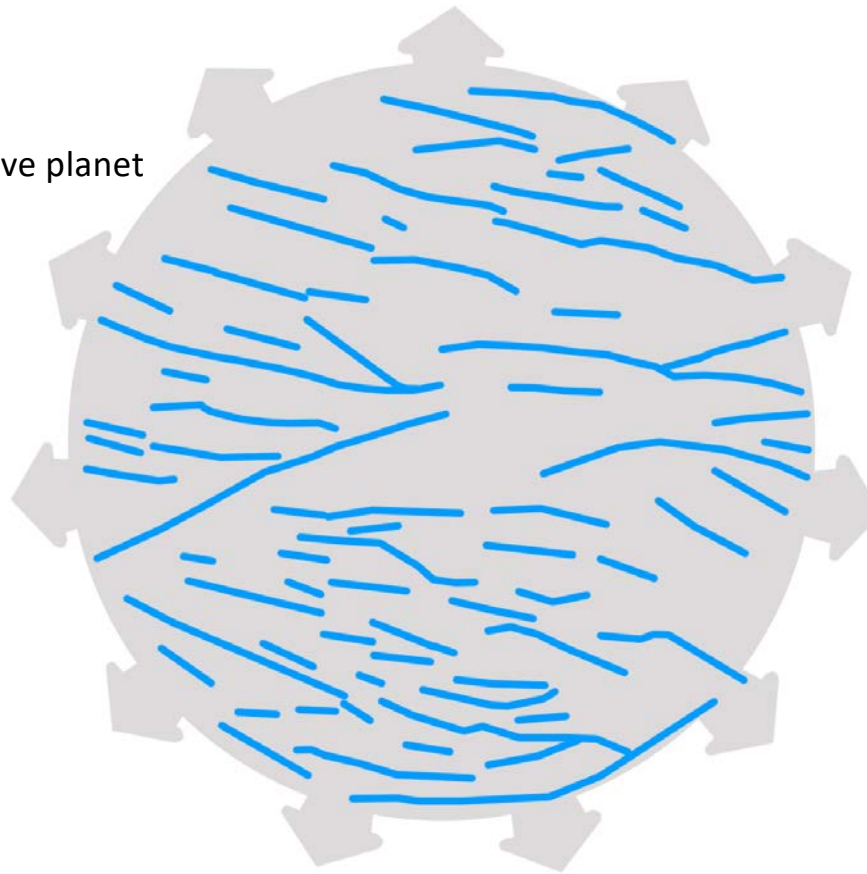


## Urban Design

Key Premise

Change space – change behavior – save planet

Network issues  
E-W



Network issues

Change space

Change behaviour

Save lives

Save planet





## Urban Design

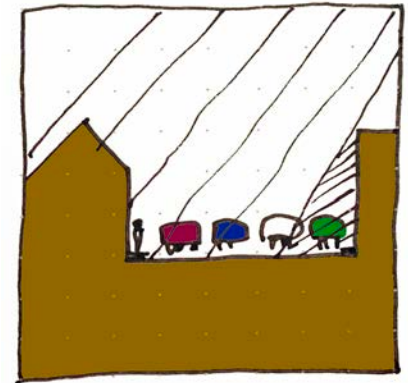
### Key issues

Change space – change behavior – save planet

Get people out of the car.... 2000 deaths a year from circulatory problems....



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.



Get people out of the car

Change space

Change behaviour

Save lives

Save planet



Nicosia, Cyprus. May 2019

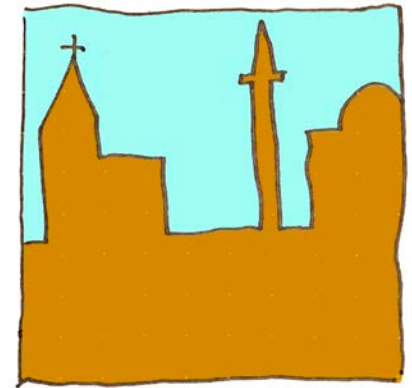
## Urban Design

History to heritage

How do we unlock resilience and keep all histories.....



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



History to heritage

History

History

History

People

Local global



Nicosia, Cyprus. May 2019



## Urban Design

### The Challenge

Invent something that you will actually do !

Affordable

Time-bound

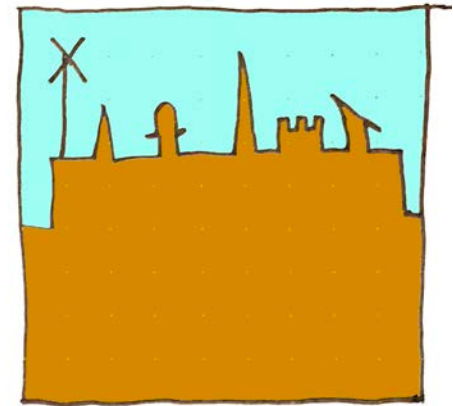
Methodological and Emergent

Politically acceptable

Understandable by all

Yet.....

Radical – because it's an emergency!!



### The Challenge

Community buy-in

But radical change

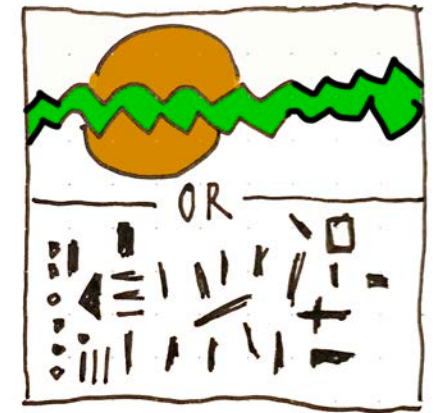


## Urban Design

### Greenzone



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.



### Green zone analysis

Green zone

Geographically  
immense

Spatially invisible



Nicosia, Cyprus. May 2019

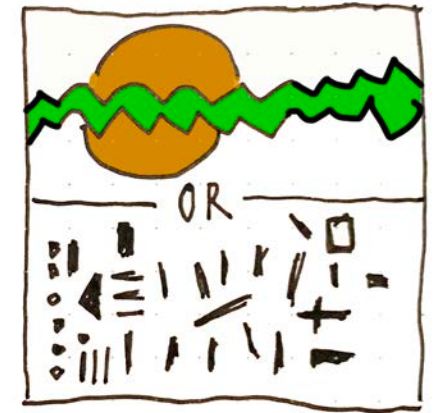


## Urban Design

Greenzone



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.



Green zone analysis

Green zone

Geographically  
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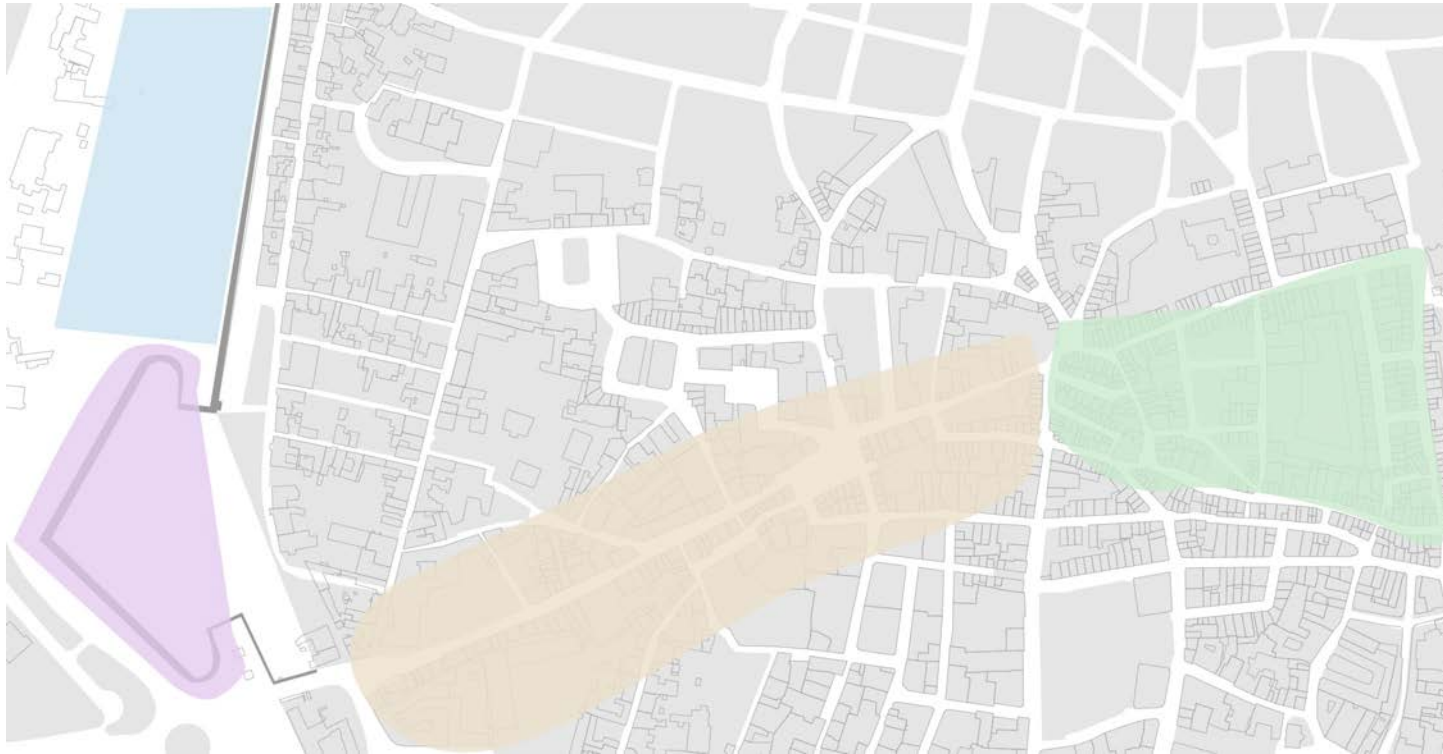
Spatially invisible



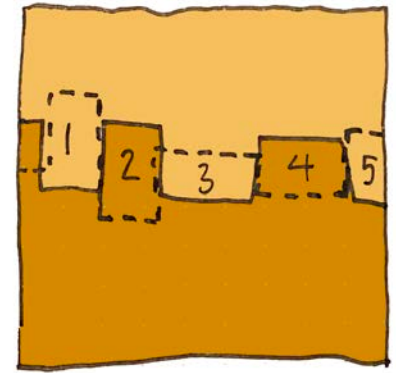
Nicosia, Cyprus. May 2019

## Urban Design

### Zoning the Greenzone



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



### Peacemeal Green-zone

Green zone

Too complex to  
remove wholly

So do in bits.....

Benefit each side

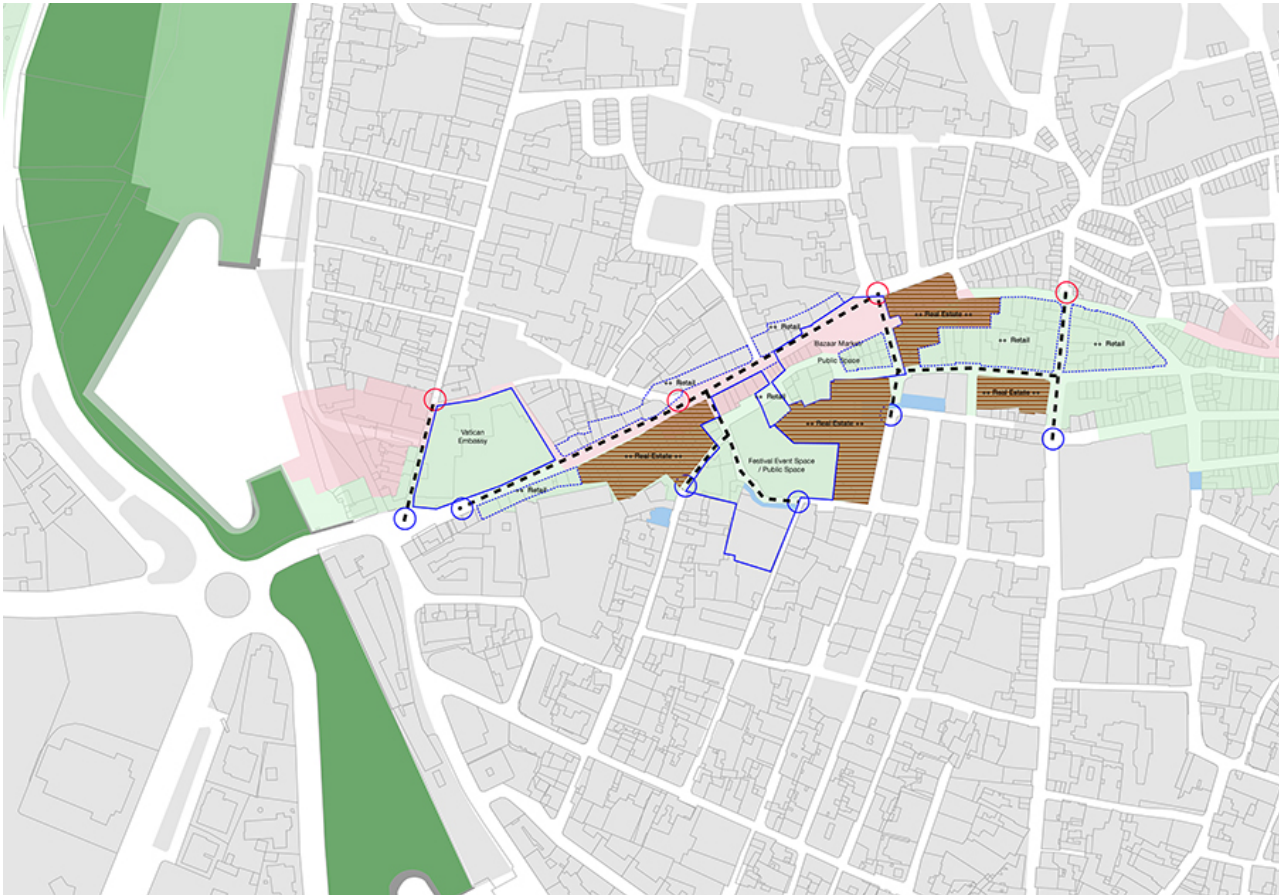


Nicosia, Cyprus. May 2019

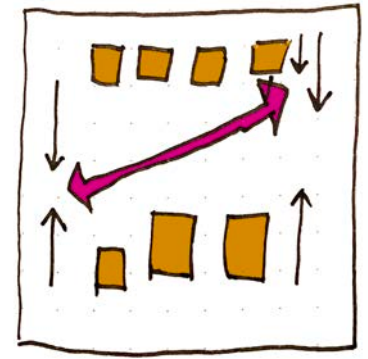


## Urban Design

Create a centre. Green Line changes



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.



Create a shared Centre

New centre

One new gate

Neutral space

Co-developed



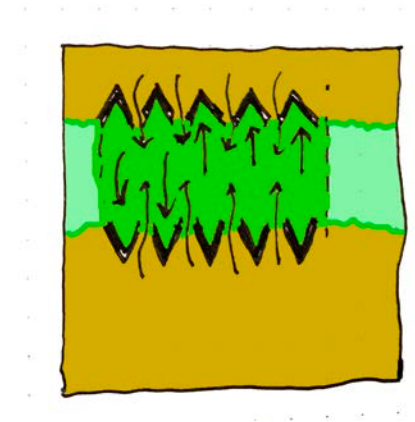
Nicosia, Cyprus. May 2019

## Urban Design

Create a centre. Green Line changes. Airline pass



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.



Create a centre

Airport pass

All Cypriots

Tourists pay in advance

One side or both side clearance



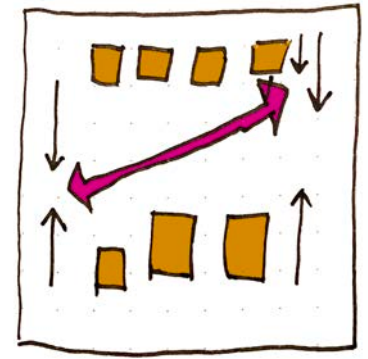
Nicosia, Cyprus. May 2019



## Urban Design

Create a centre. Green Line changes

From



### The Bazaar

New centre

One new gate

Neutral space

Co-developed



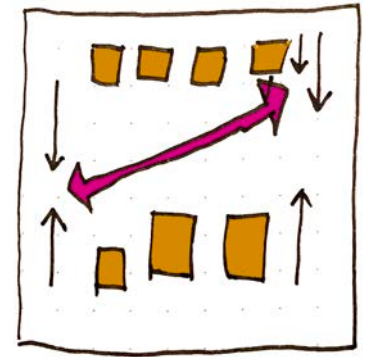
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Nicosia, Cyprus. May 2019

## Urban Design

Create a centre. Green Line changes

To



## The Bazaar

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Neutral space

Co-developed



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.

Nicosia, Cyprus. May 2019

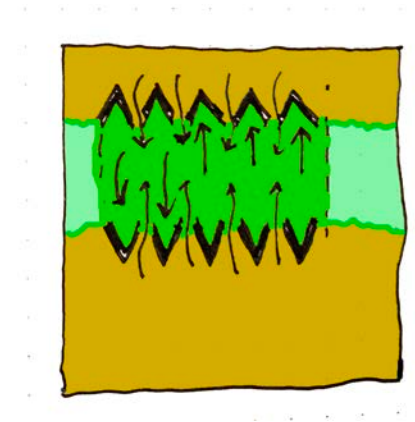


## Urban Design

Green line moves Central zone. Ledra Street westwards.



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.



Green line detail

Check-in to zone

Airport gate... register  
in advance

Seamless check in and  
out



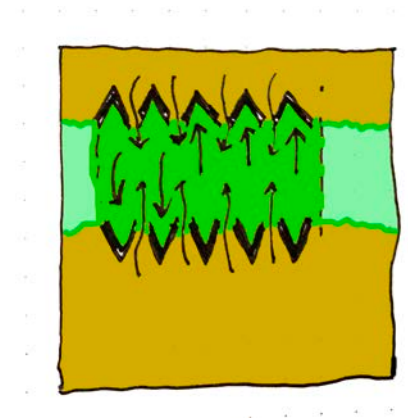
Nicosia, Cyprus. May 2019

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Nicosia, Cyprus. May 2019

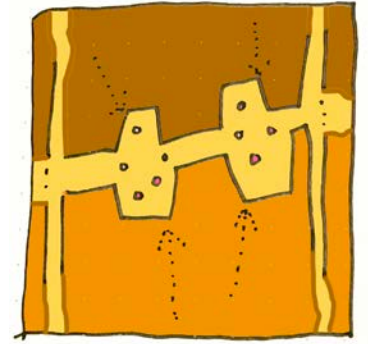


## Urban Design

Green line moves  
New streets, New square.



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



New shared centre

New streets

Shared heritage



Nicosia, Cyprus. May 2019

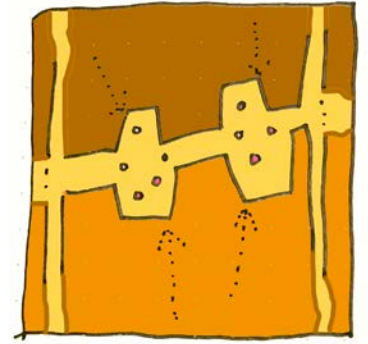
## Urban Design

Green line moves

New street



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



New shared centre

New streets

Global/Local  
infrastructure



Nicosia, Cyprus. May 2019



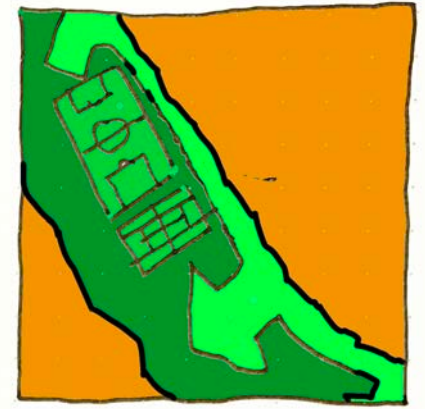
## Urban Design

Green line moves

New Sports place.



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



New shared centre

Shared sports in  
between the  
bastions....

Click in/Click out



Nicosia, Cyprus. May 2019



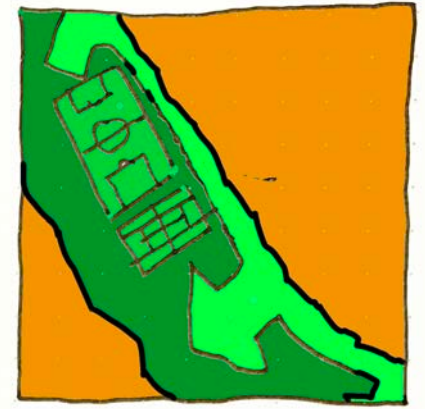
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Green line moves

New Sports place.



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Nicosia, Cyprus. May 2019

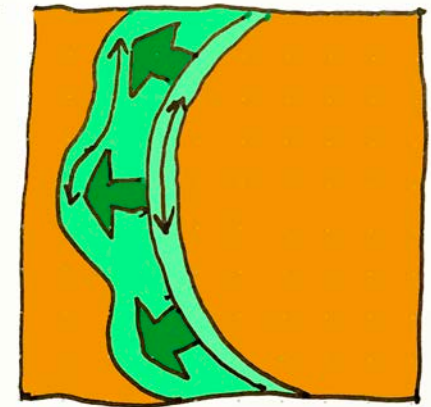


## Urban Design

The Green ring.....



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



New green park

Sports

Cycle routes

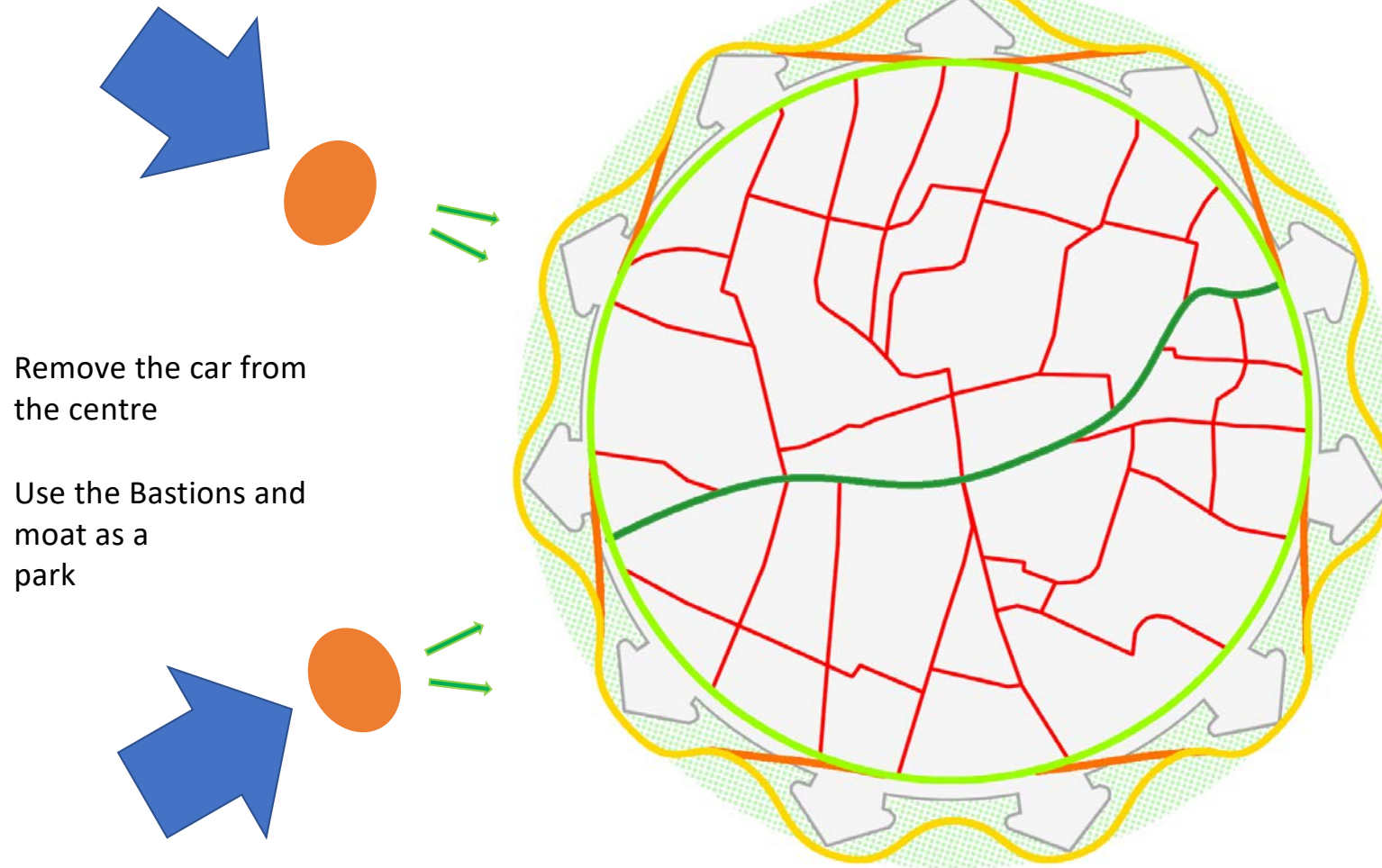
Tree nursery

Climate protection

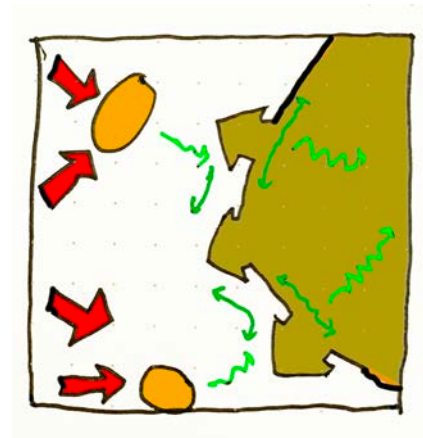


Nicosia, Cyprus. May 2019

## Urban Design



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



## Car removal

- reduced intensity
- Everyone exercises
- Shaded routes
- Lower temperatures



Nicosia, Cyprus. May 2019



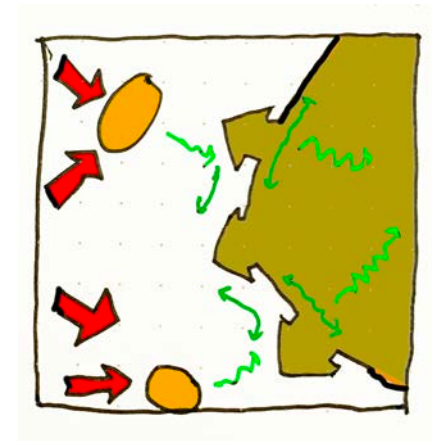
## Urban Design

Car removal

Park and Ride (a bike) or walk



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



Car removal

reduced intensity

Everyone exercises

Shaded routes

Lower temperatures



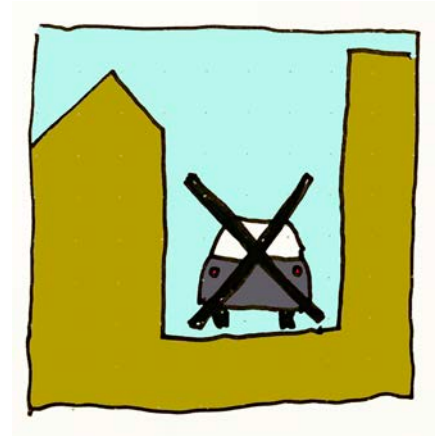
Nicosia, Cyprus. May 2019

## Urban Design

### Car removal inside the ring



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.



Car removal

Inner city changes

People first

Green  
infrastructure



Nicosia, Cyprus. May 2019

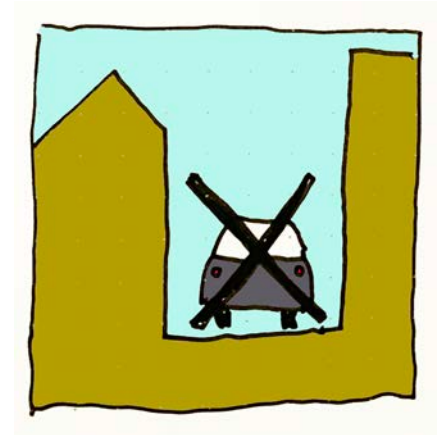


## Urban Design

Car removal inside the ring  
Creates people space



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



Car removal

Inner city changes

People first

Green  
infrastructure



Nicosia, Cyprus. May 2019

## Urban Design

### The Bastion park



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



### The Bastion Park

Increased green

New infrastructure

Energy/mobility/social

Tourist/heritage  
enabling



Nicosia, Cyprus. May 2019



## Urban Design

### The Bastion park



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



### The Bastion Park

Increased green

New infrastructure

Energy/mobility/social

Tourist/heritage  
enabling



Nicosia, Cyprus. May 2019

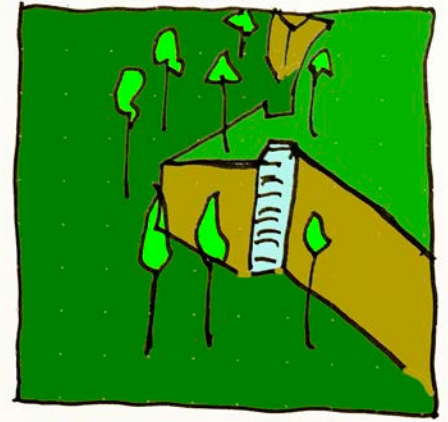


## Urban Design

### The Bastion Park



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



### The Bastions

Increased green

New infrastructure

Energy/mobility/social

Tourist/heritage  
enabling



Nicosia, Cyprus. May 2019

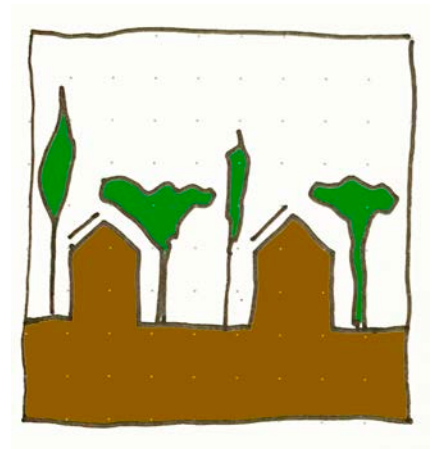


## Urban Design

City as forest

Hide the city in a forest

Hide a forest in the city.....



City as forest

Increased intensity

Community  
services

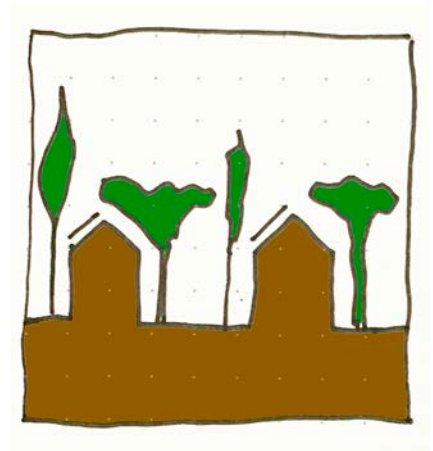
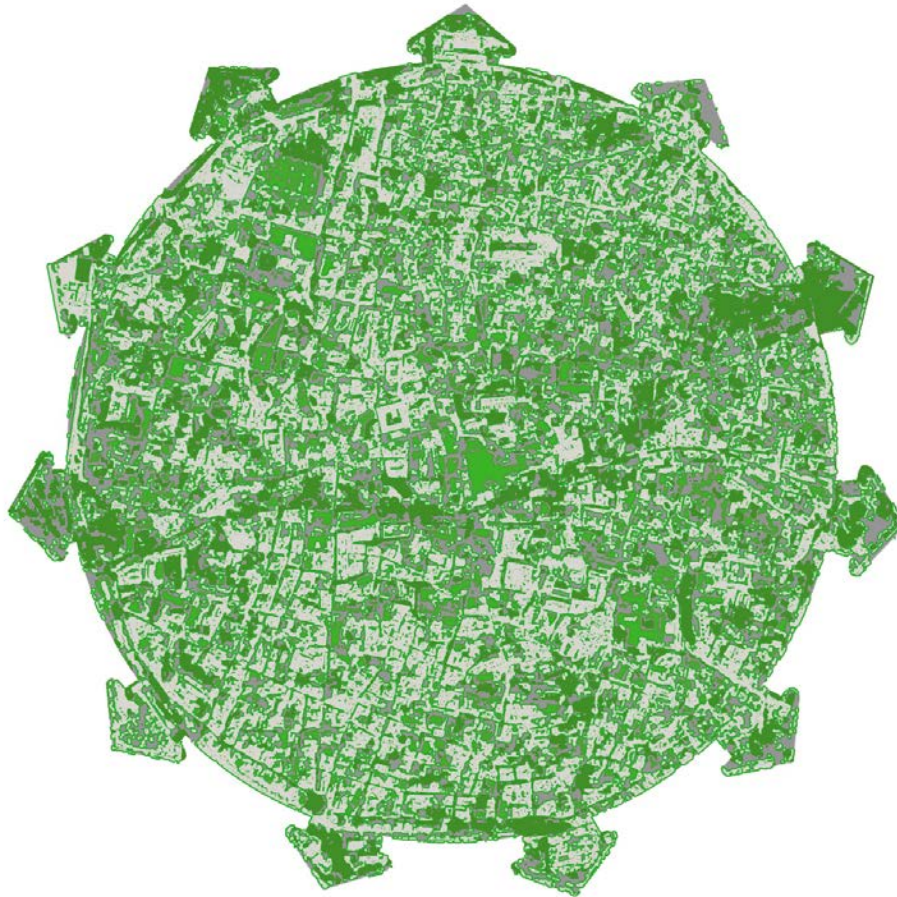
Increased density

Reason to visit



## Urban Design

### Green the city



### City as forest

Increased intensity

Community  
services

Increased density

Reason to visit



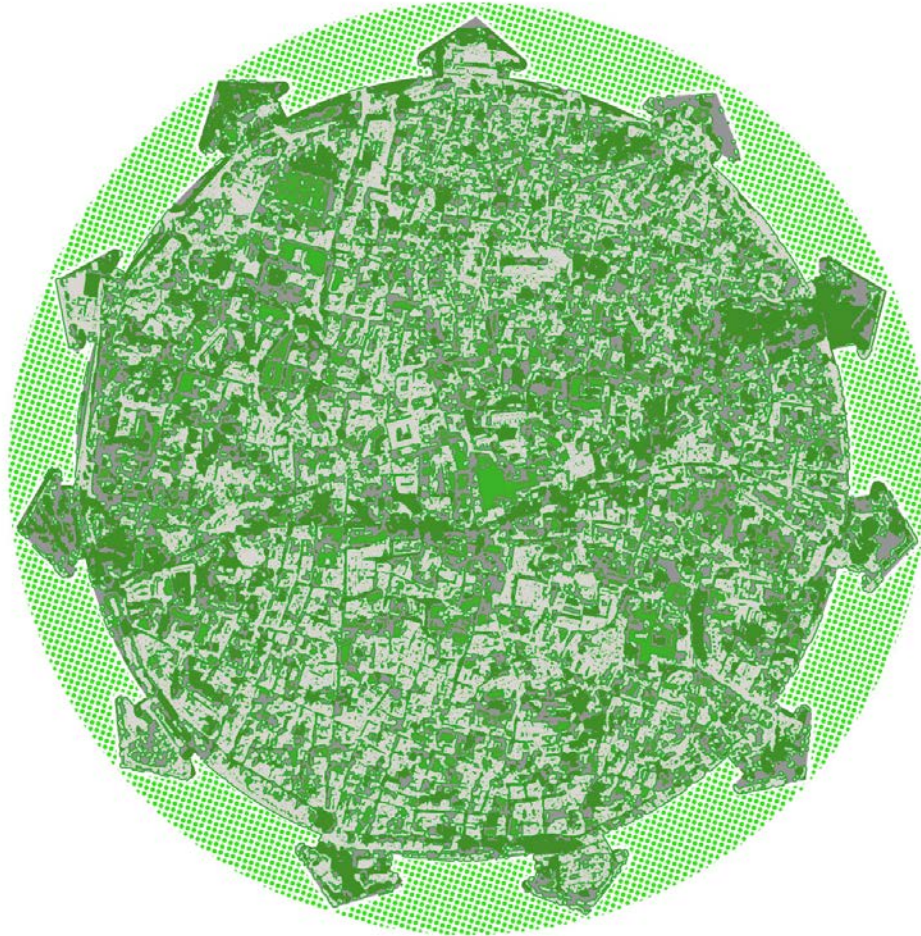
Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.

Nicosia, Cyprus. May 2019

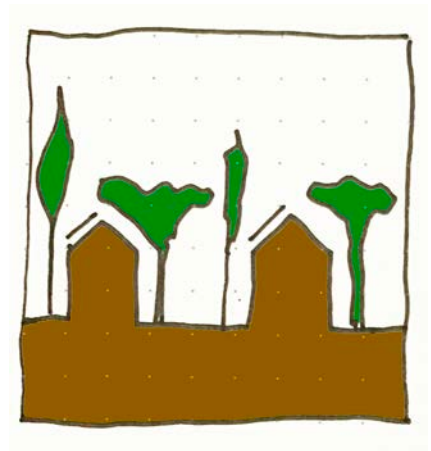


## Urban Design

### Green the Bastions



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



### City as forest

Increased intensity

Community  
services

Increased density

Reason to visit



Nicosia, Cyprus. May 2019

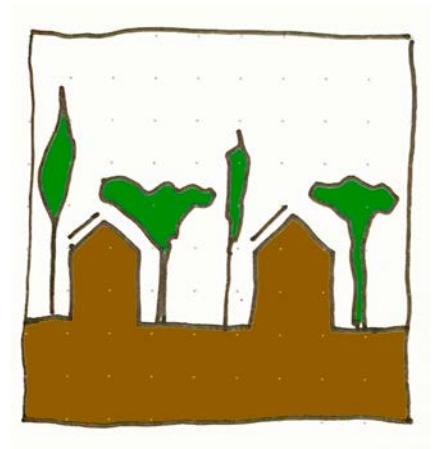
## Urban Design

### City as forest

Hide the city in a forest –  
Hide a forest in the city.....



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.



### City as forest

Increased intensity

Community  
services

Increased density

Reason to visit



Nicosia, Cyprus. May 2019



## Urban Design

City as forest

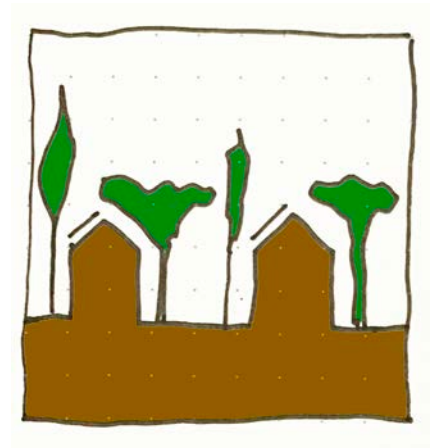
Hide the city in a forest –

Hide a forest in the city.....

Greywater facades



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



City as forest

Increased intensity

Community  
services

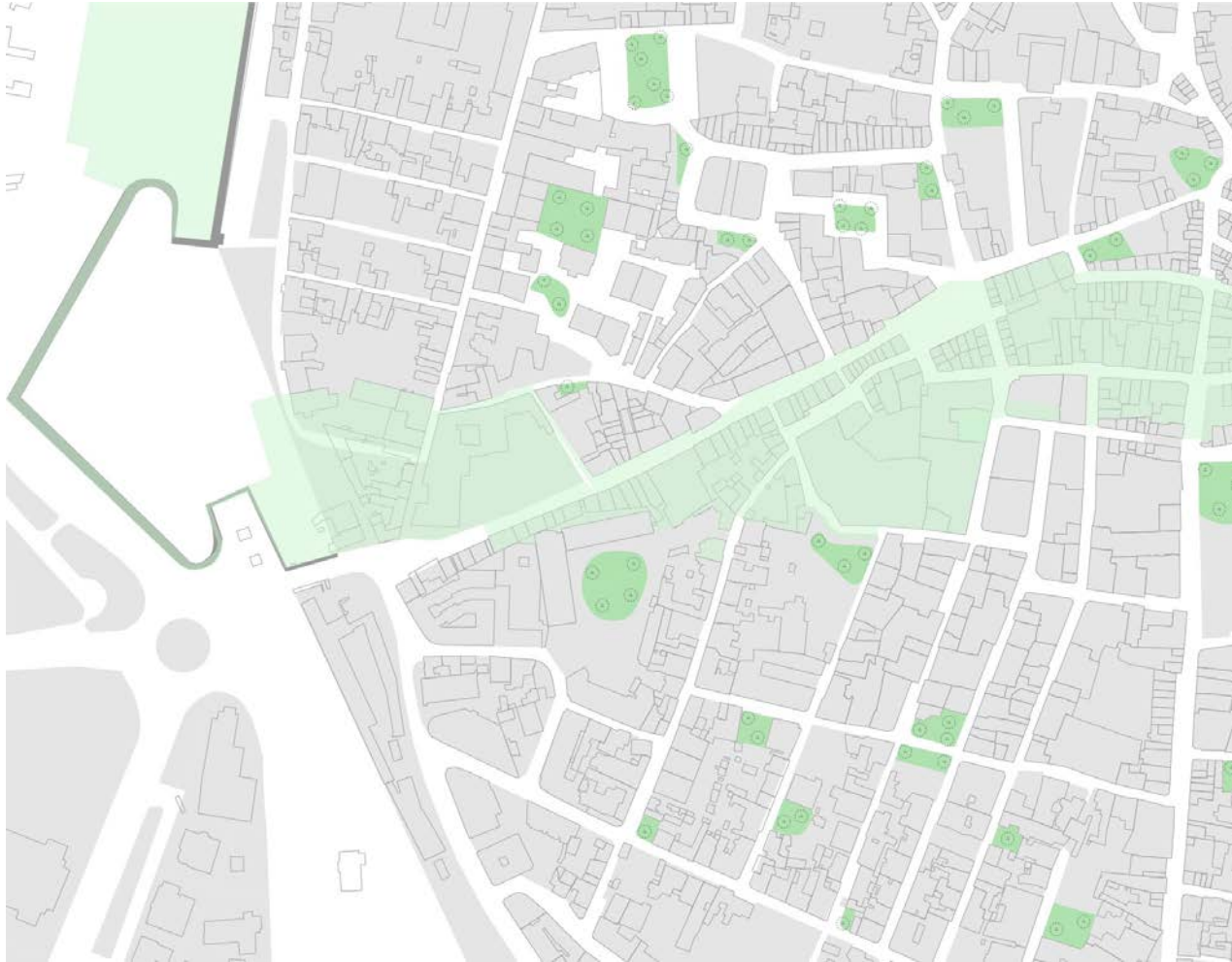
Increased density

Reason to visit

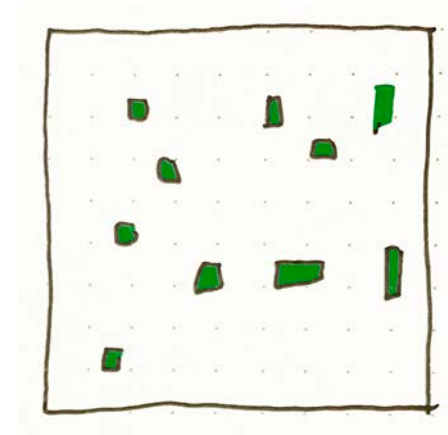


Nicosia, Cyprus. May 2019

## Urban Design



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



### Pocket parks

Re-purpose car-parks.

New 100m infrastructure that reduces heat island effect



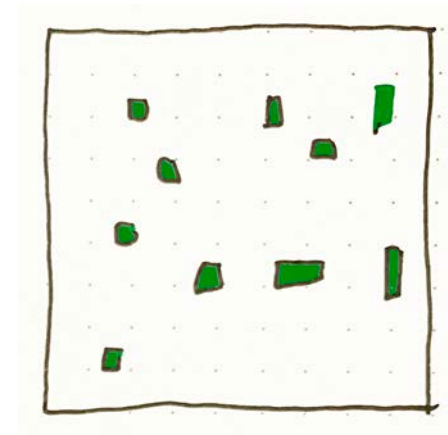
Nicosia, Cyprus. May 2019



## Urban Design



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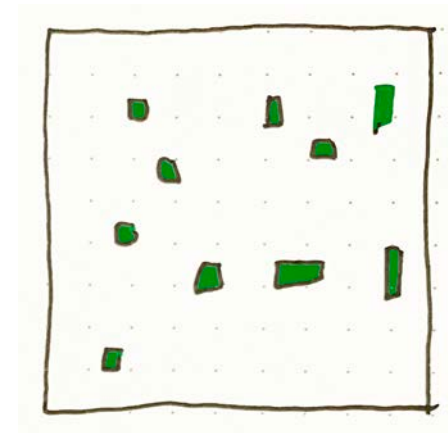


Nicosia, Cyprus. May 2019

## Urban Design



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



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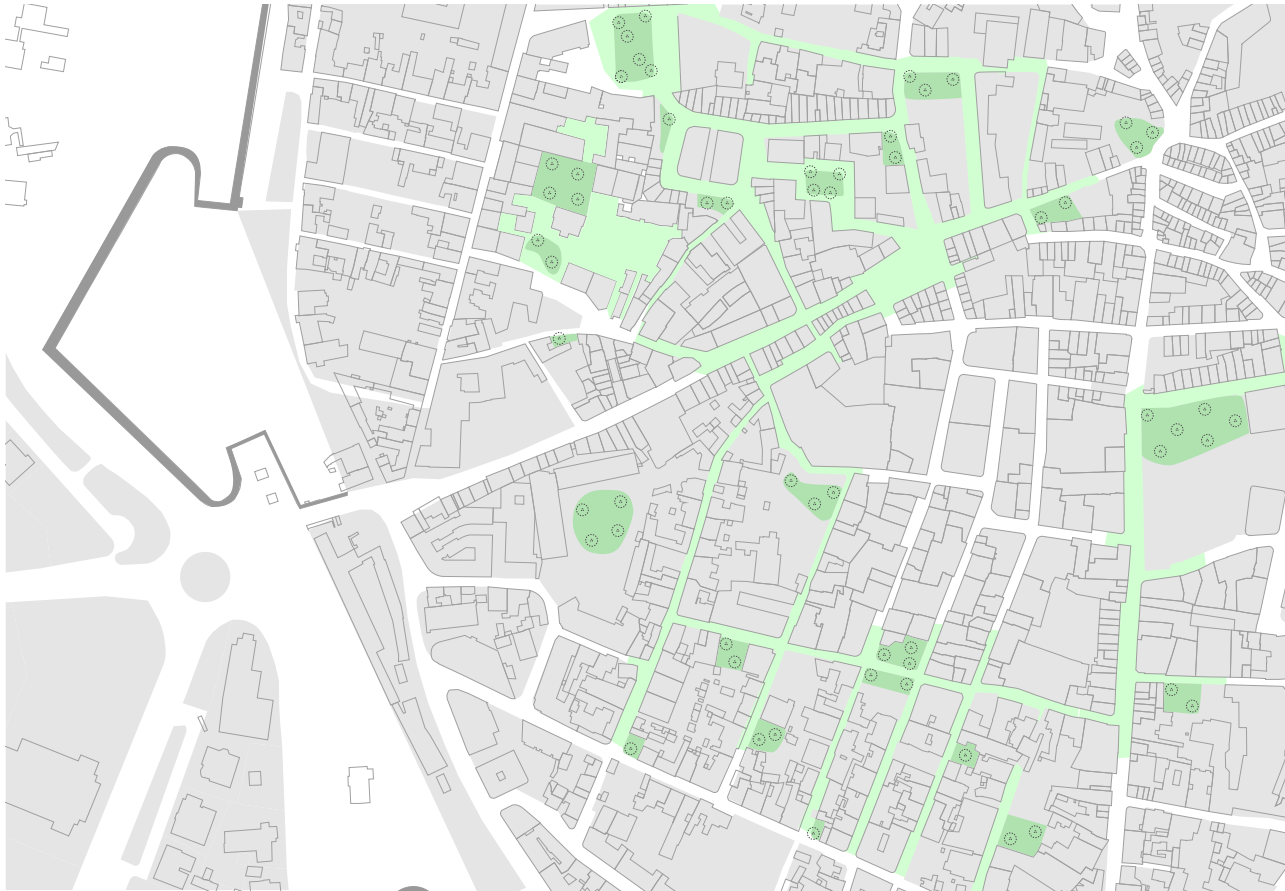


Nicosia, Cyprus. May 2019

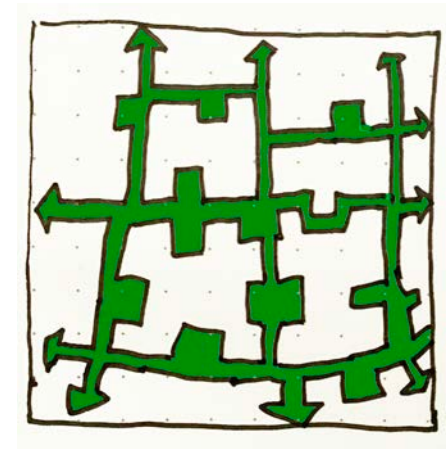


## Urban Design

### Green network



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



### Green Network

Connect inner-city  
Pocket parks.

Make shaded  
network of places  
to walk

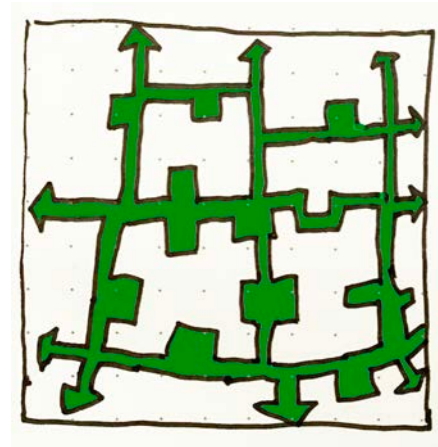


Nicosia, Cyprus. May 2019

## Urban Design



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.



### Green Network

Connect inner-city  
Pocket parks.

Make shaded  
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to walk

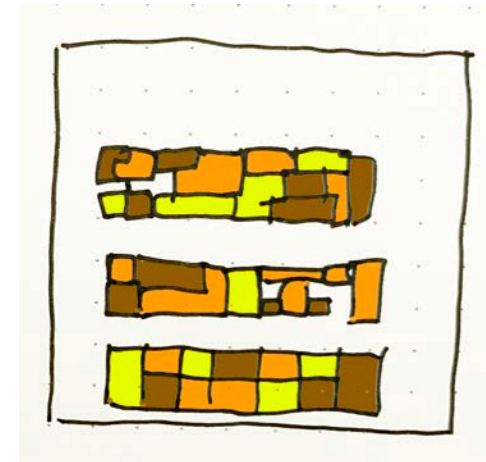
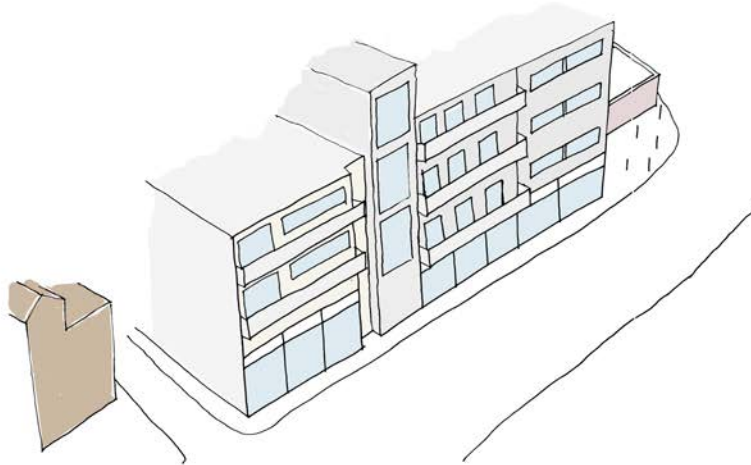


Nicosia, Cyprus. May 2019



## Urban Design

### Densification - south



### Densification

Increased density

Increased intensity

More shade

Better community  
services

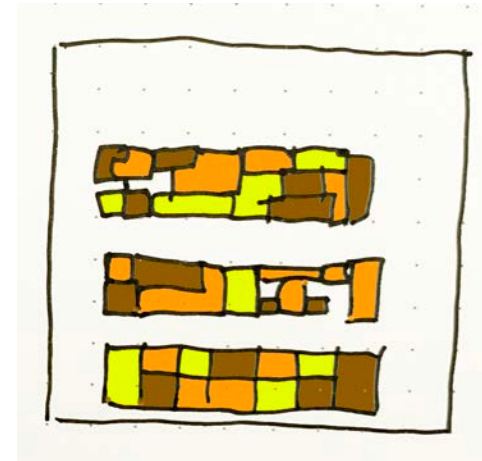


## Urban Design

### Densification + greening



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



### Densification

Increased density

Increased intensity

More shade

Better community  
services

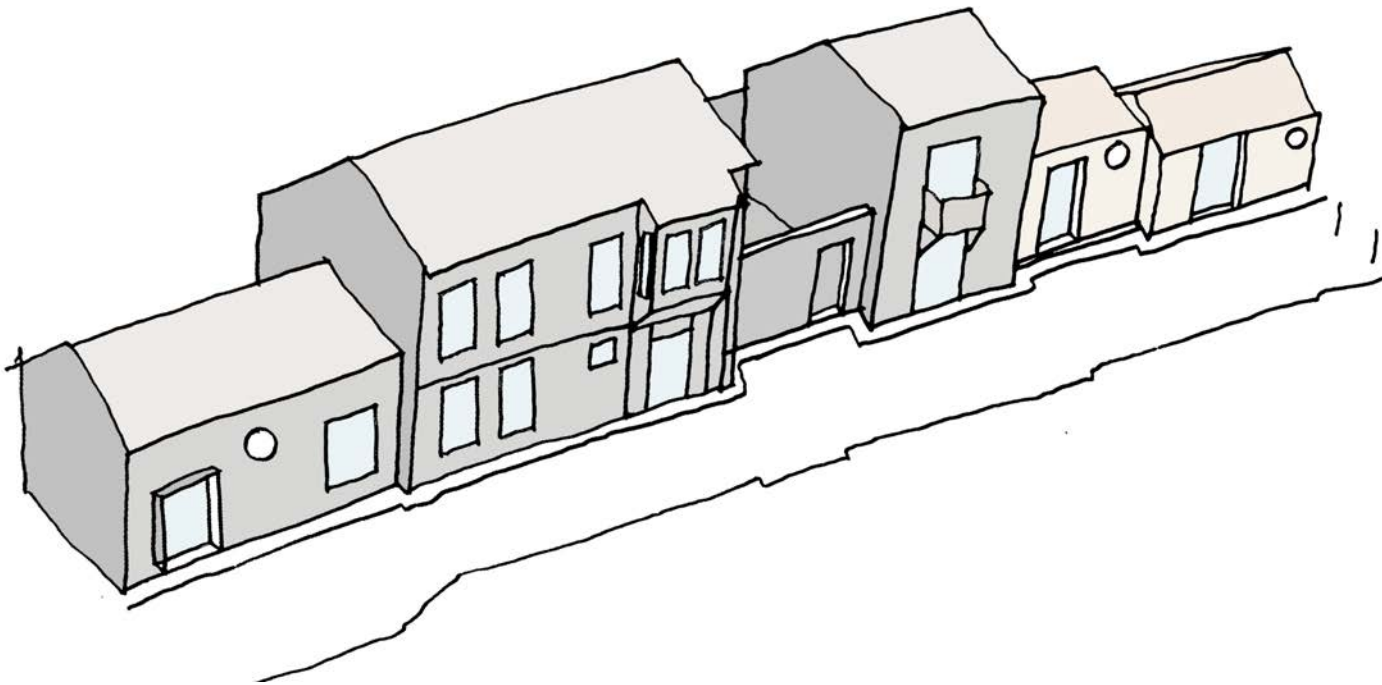


Nicosia, Cyprus. May 2019

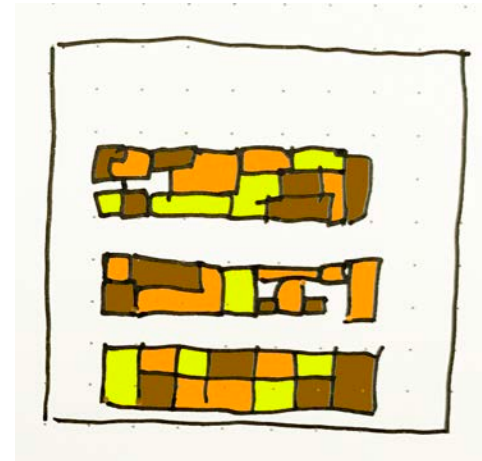


## Urban Design

### Densification North



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



### Densification

Increased density

Increased intensity

More shade

Better community  
services



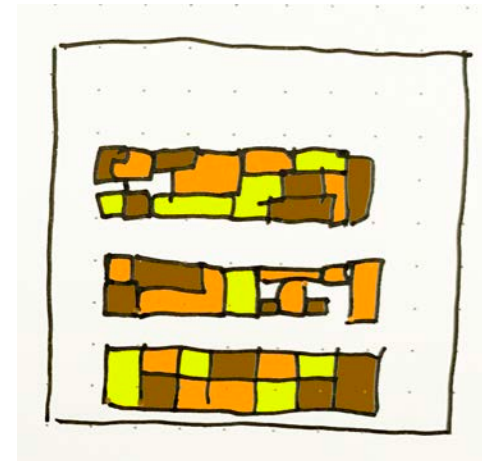
Nicosia, Cyprus. May 2019

## Urban Design

### Densification and greening



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



### Densification

Increased density

Increased intensity

More shade

Better community  
services



Nicosia, Cyprus. May 2019



## Urban Design



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.



Re-invent the street

Reclaim territory  
from the car

New community

Increased intensity



Nicosia, Cyprus. May 2019



## Urban Design



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.



Re-invent the street

Reclaim territory  
from the car

New community

Increased intensity

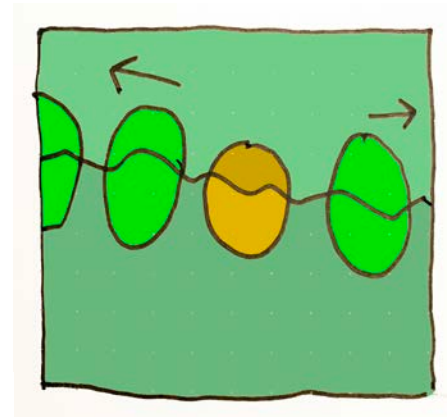
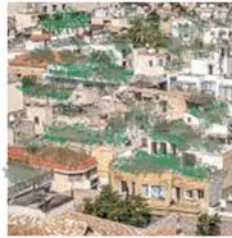


Nicosia, Cyprus. May 2019



## Urban Design

Climate sequestration... grow the forest in the city and plant it out.....



## Climate sequestration

World issue

Do your share

1.2 million trees per  
year for a century

100 cities.....



Urban design strategy: Prof Greg Keffe, Queens University, Belfast.

Nicosia, Cyprus. May 2019

## Urban Design



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.

### Mustafa Ozan

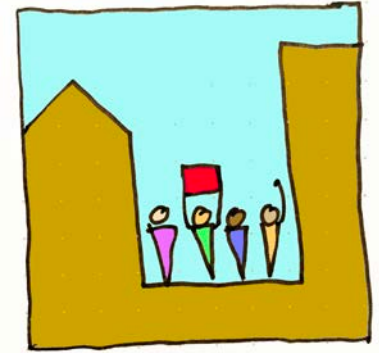
“Hi, I’m Mustafa,

I lived and worked within the walls of Nicosia all my life and run my own business creating hand crafted belts, and bags. The new co-community bazaar in the Green zone, has allowed me to connect better with more customers and especially tourists.

Since pedestrianisation and the electric car share facility I have found the city to be much safer for my children, I too feel so much healthier, and happier and I’ve found that I have met many new people and made new friends, as I no longer confine myself to my car.

The new car share at the city walls has allowed me to use different vehicles when I need them. I can now get a van when I need to collect materials and a campervan for the family trips at the weekend

I was sceptical at first but I feel the changes in the city have really improved my quality of life.”



### Pen picture 1

Keep it local



Nicosia, Cyprus. May 2019



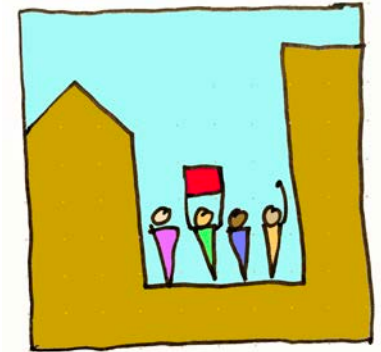
## Urban Design

Helen Papoulis

"I'm 10 years old and now that it's safer to walk my mum let's my brother and I walk to school. After school me and my friends would go and play on the swings in the park. It's very fun! My brother likes to play football with his friends there as well. It seems everyone is at the park!

We even have events in the old chariot race area and loads of people gather to watch!

It's like we are back in time celebrating sports."



Pen picture 2

Kids deserve a  
better future





## Urban Design

### Ela Sari

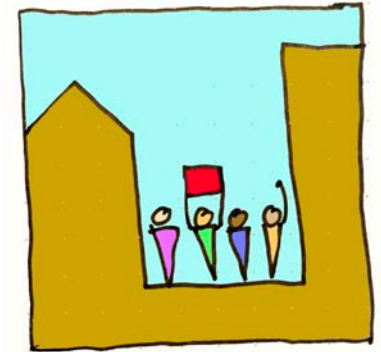
“Hello, my name is Ela,

My family home is in the suburbs of Nicosia. I spend much of my time within the walls of the city as my children go to school there and I work as an architect in the walls.

I can take the kids after School to the Park. There's more wildlife within the city walls now, and the city air also seems to be easier to breath and cleaner.

My new P.V. panels on my roof have drastically decreased are energy bills making it possible for us to now afford more meals out, and the ability to go do activities with the kids means a less stressful life. I feel the changes to Nicosia have really made mine and my children's lives better.

I now cycle to work every day from outside the walls using the bike share and really enjoy it. We are now considering, when the kids are older ,moving into the walled city to get more out of the new streets and parks.”



Pen picture 3

Help the commuter



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.

Nicosia, Cyprus. May 2019



## Urban Design

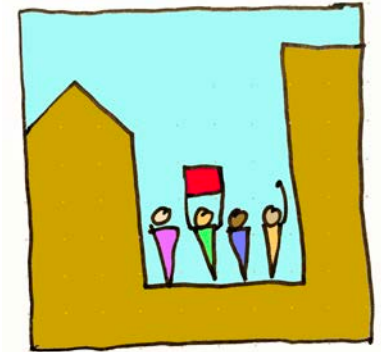
### Alexandro Angelos

"I came to study from abroad at the University. I really enjoy the lifestyle and culture. I can now rent in the middle of the city and all the restored buildings make the experience very unique. There is nowhere else I would rather work!"

The city has become a hub for new bands and up and coming artists. Every Friday evening there are usually performances in new public space that everyone comes to. The shared public spaces have allowed people from the north and south to mix and spend time together. This has increased trade and hand-crafted items within the walls.

I now cycle everywhere it's a lovely way to see Nicosia and its historical features. Me and my friends have all stayed within the city to work and live after are study's. Many more people want to live within Nicosia now and not many people are moving away to work elsewhere.

I would not move from my Nicosia now as it is as good as New York, London and Amsterdam if not better in my eyes and would recommend this city to anyone who asked."



Pen picture 4

New  
entrepreneurship



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.

Nicosia, Cyprus. May 2019



## Urban Design

More More More More...



Urban design strategy: Prof Greg Keeffe, Queens University, Belfast.

### Queens

Prof Greg Keeffe

Dr Andy Jenkins

Ms Emma Campbell

### TU Delft

Sam van Hooff

### UCLAN

Ms Maryam Al-Irhayim

Rainer Townend

More History

More Green

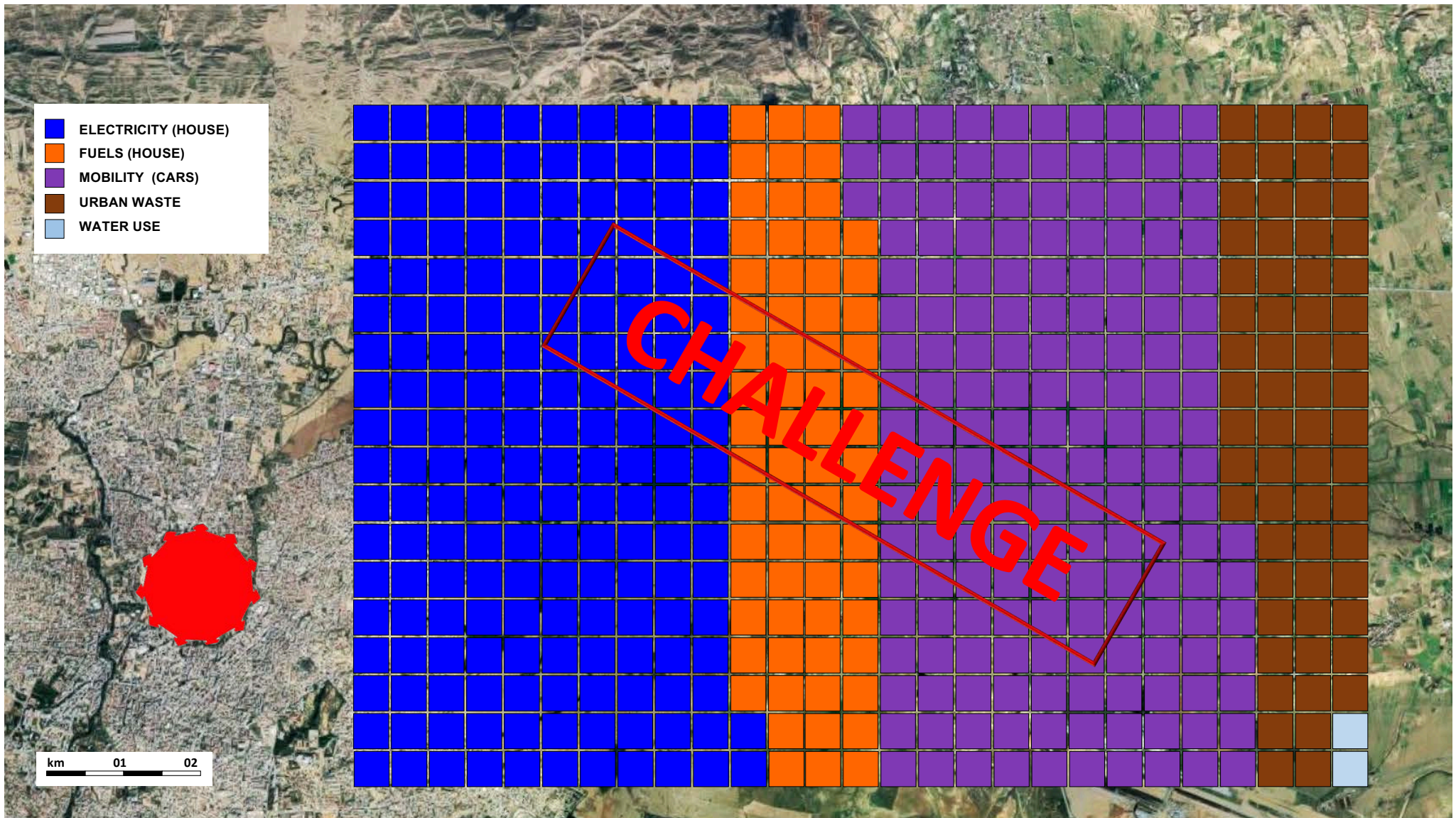
More renewables

More Fun



Nicosia, Cyprus. May 2019





3 ...

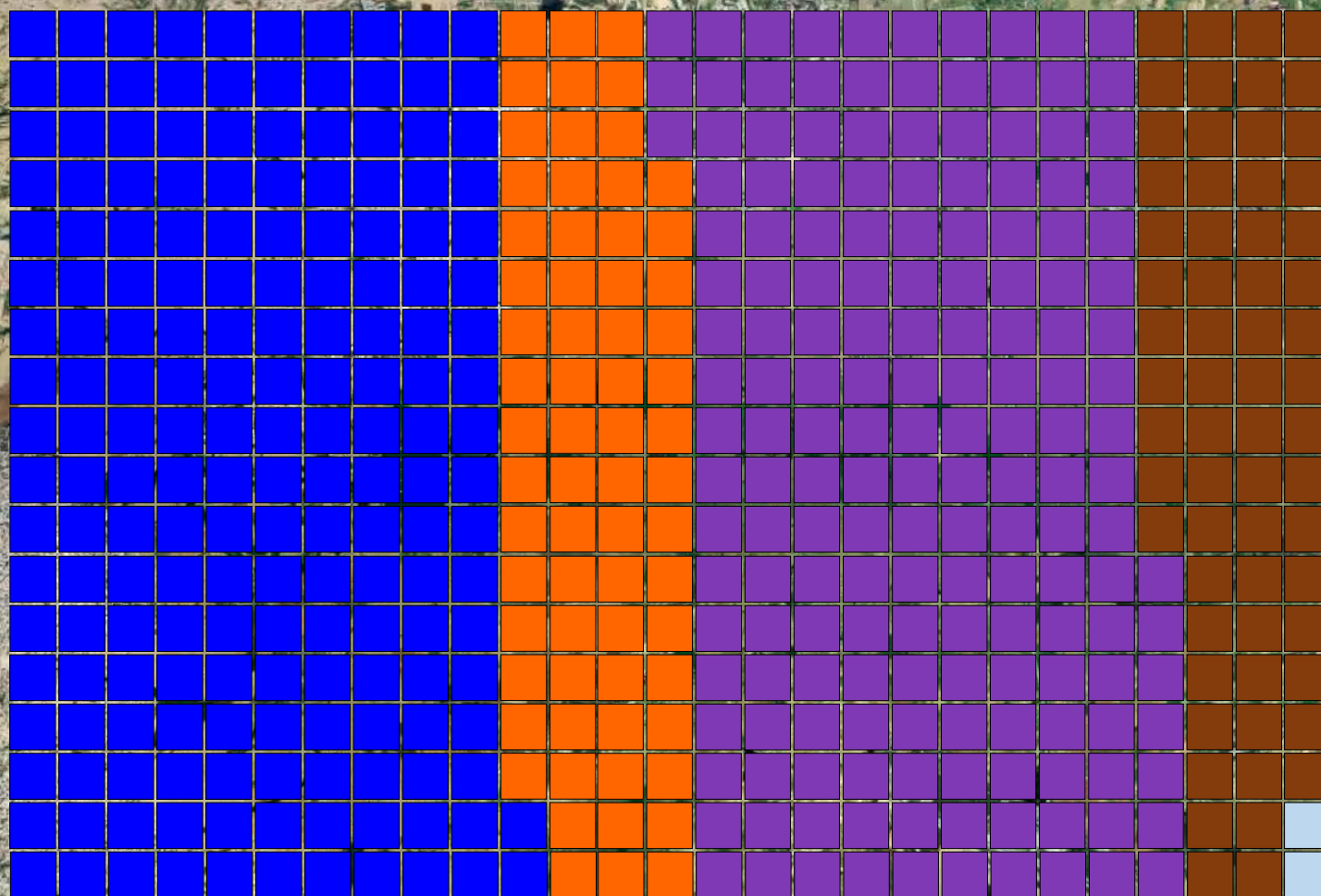
2 ...

1 ...

... GO!



km 01 02







## ENERGY SAVING

PASSIVE SYSTEMS,

GREENERY, SHADING, LED

70% households

-30% cooling energy

-30% lighting energy

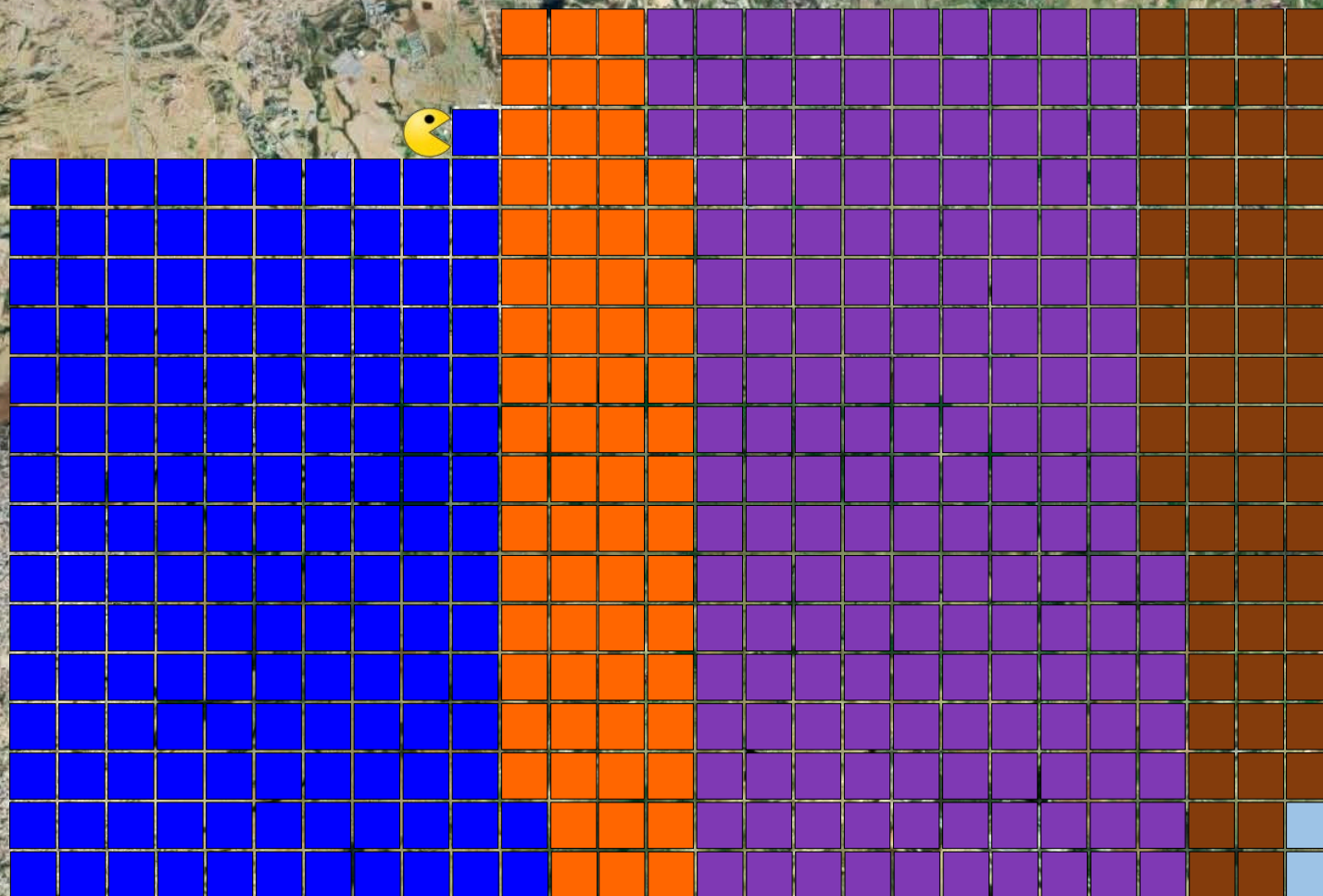
=

-14 GWh electricity



km 01 02

1





## ENERGY SAVING

INSULATION, DOUBLEGLASS

70% households

-15% cooling energy

-30% heating energy

=

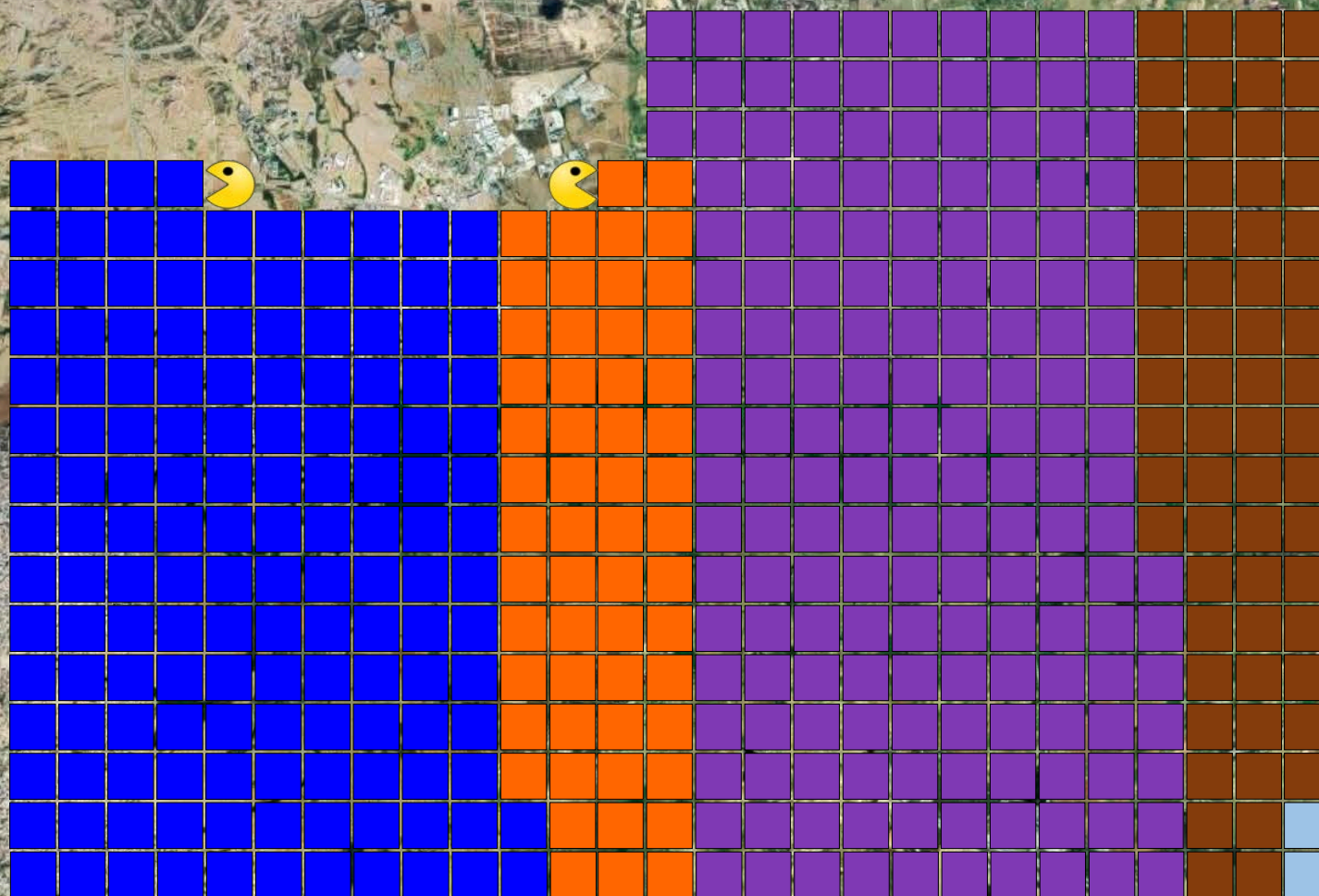
-3 GWh electricity

-15 GWh heat



km 01 02

2







## AVOIDED CARS

### PUBLIC TRANSPORT

30% households

-100% car use

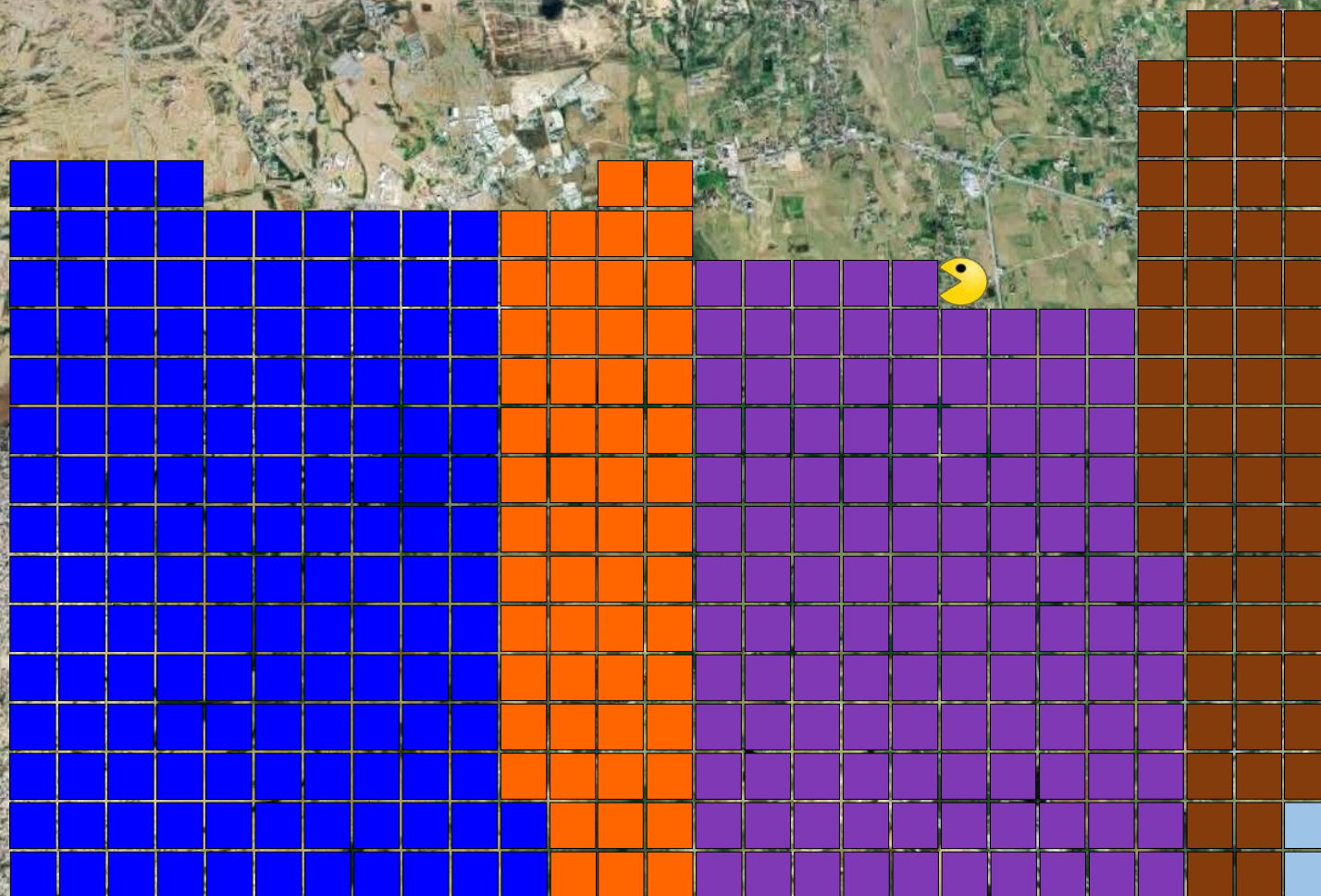
=

-100,000 km driven



km 01 02

3



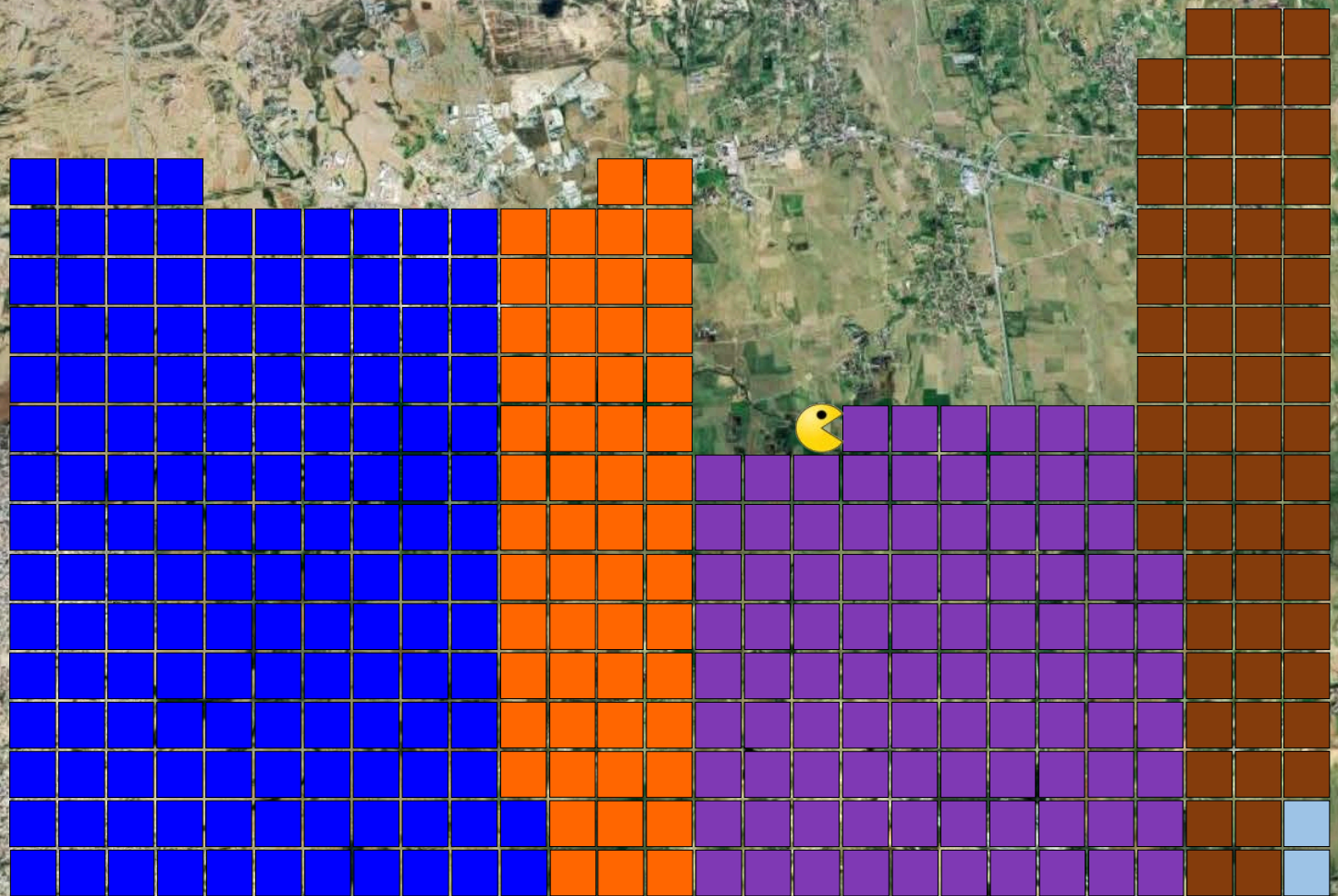


**AVOIDED CARS**  
**WALK/BIKE**  
**TO SCHOOL/WORK**  
30% households  
-50% car use  
=  
- 50,000 km driven



km 01 02

4







## WASTE MANAGE.

### WASTE REDUCTION

### LESS DISPOSAL

100% households

-16 kt/yr landfill (-90%)

+9 kt/yr recycled

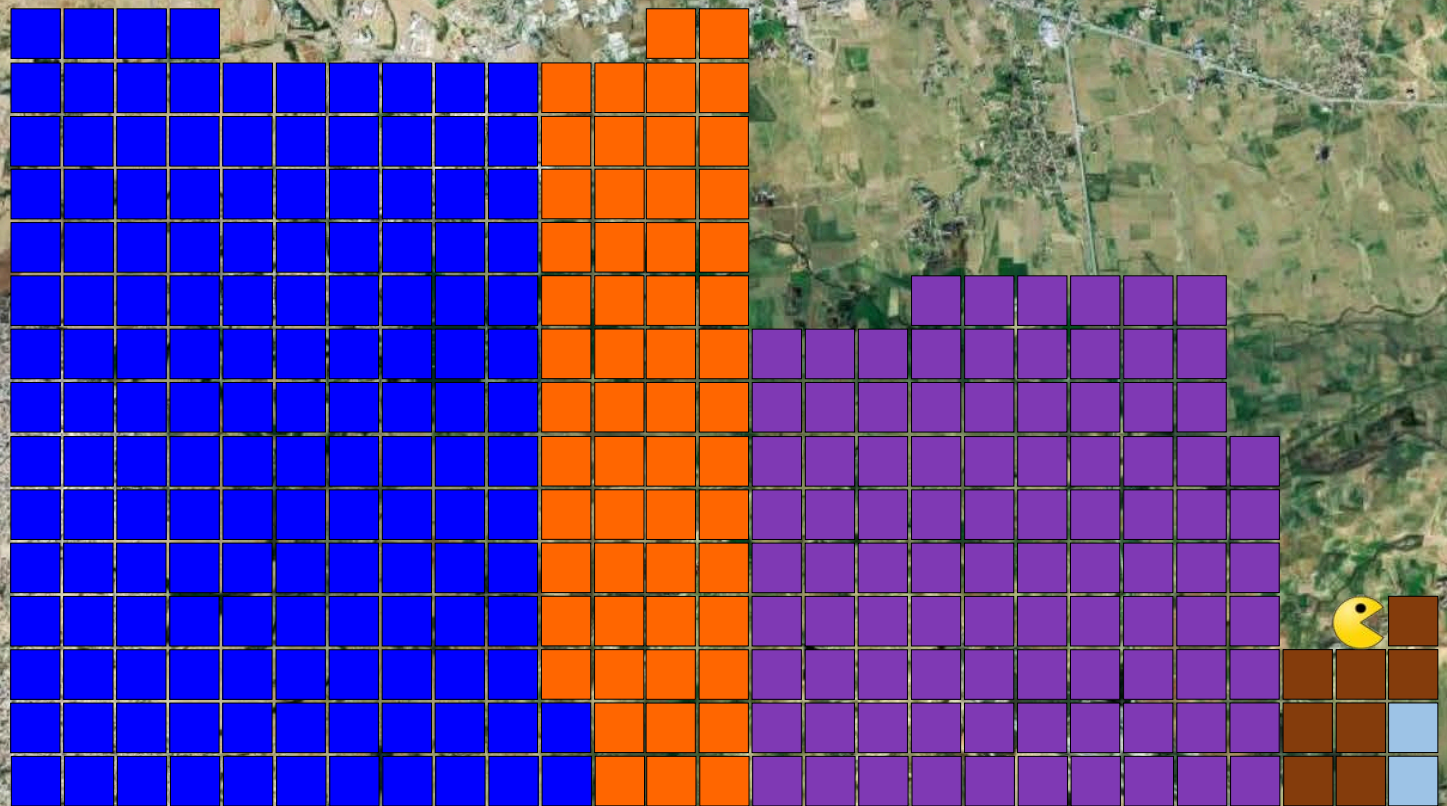
+5 kt/yr organic

-2 kt/yr produced



km 01 02

5







## WATER SAVING

## WATER HARVESTING

100% households

-40% saving

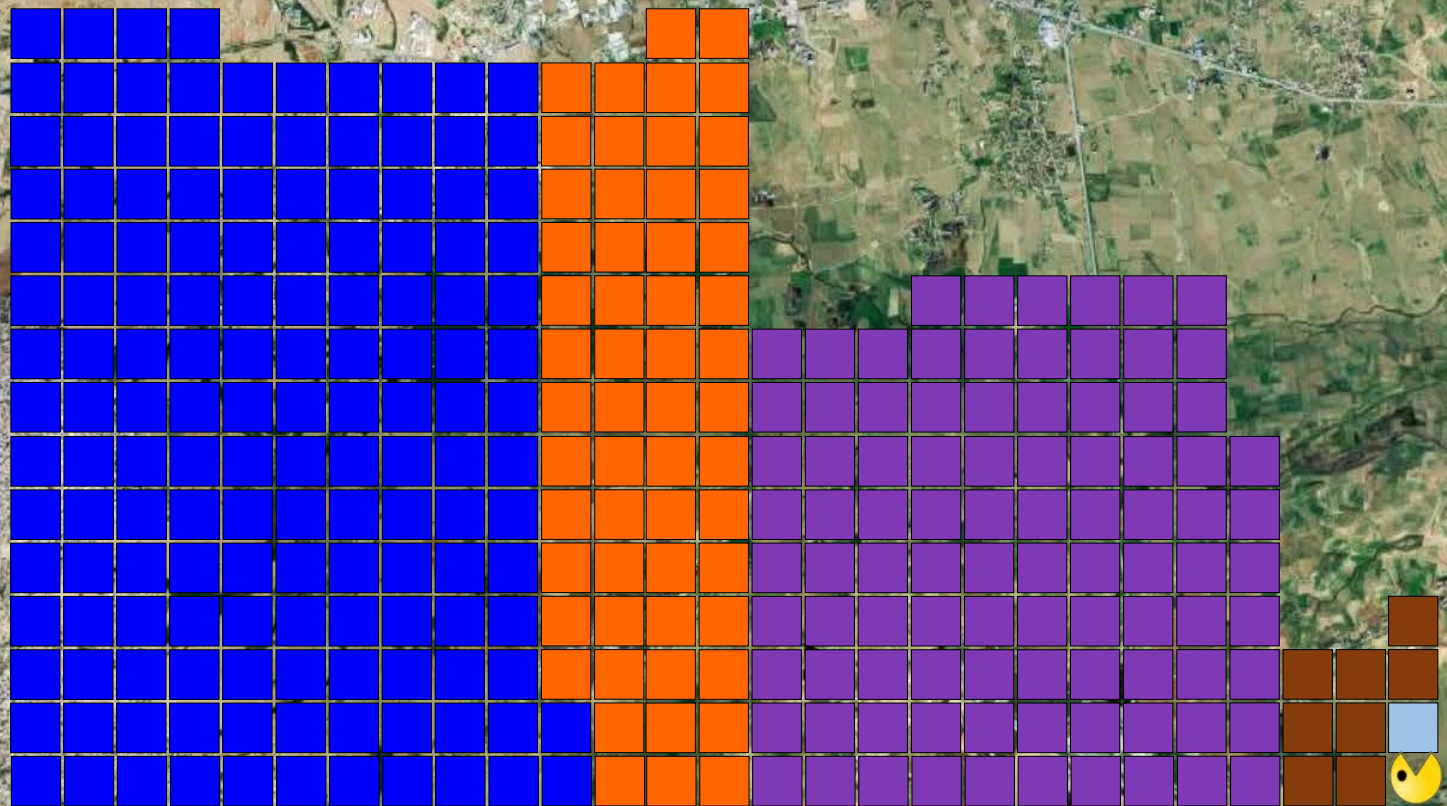
=

- 500,000 m<sup>3</sup>

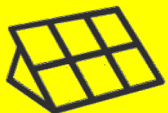


km 01 02

6







## RES HEAT SUPPLY

HT SINGLE SOLAR  
COLLECTORS

60% households

=

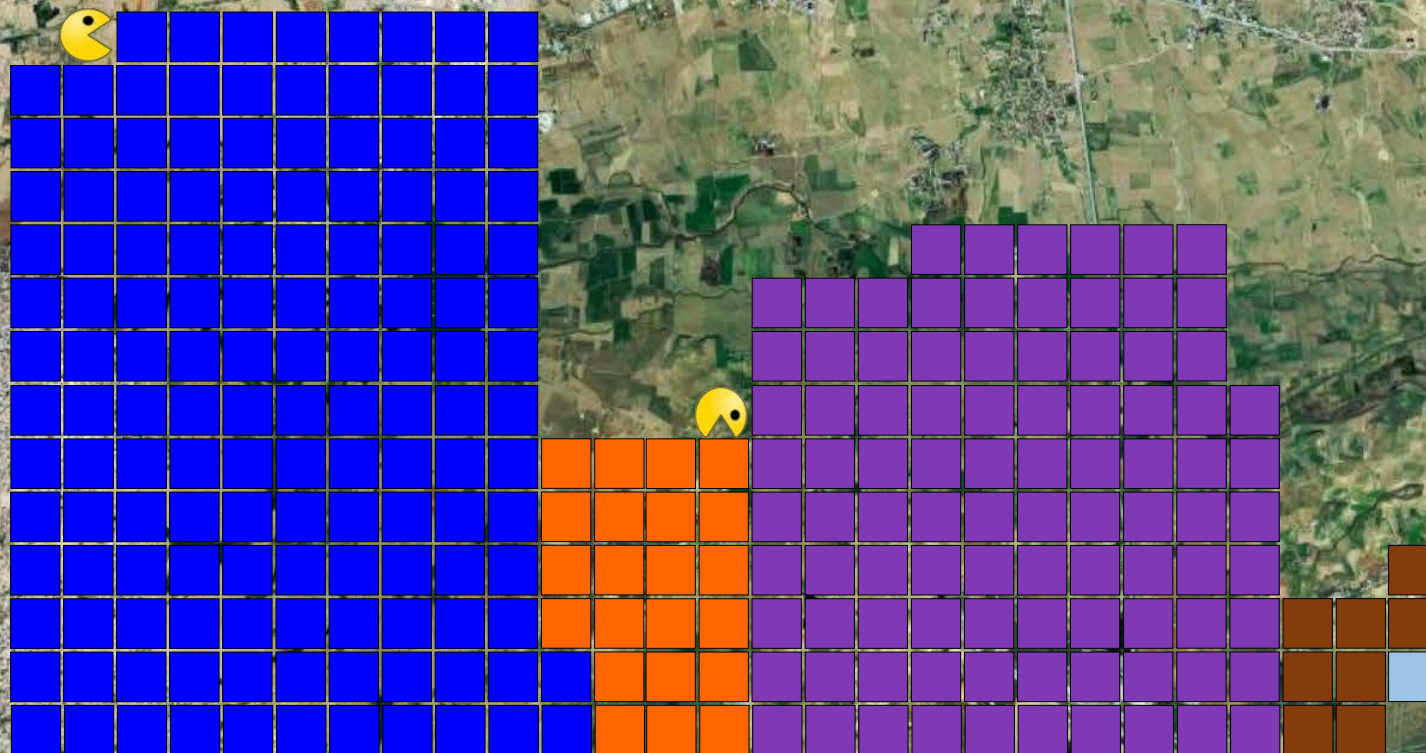
-45 GWh space & water heat

-3 GWh s&w electricity



km 01 02

7







## RES HEAT SUPPLY

MT SHARED SOLAR

COLLECTORS + HEAT PUMPS

20% households

=

-15 GWh space & water heat

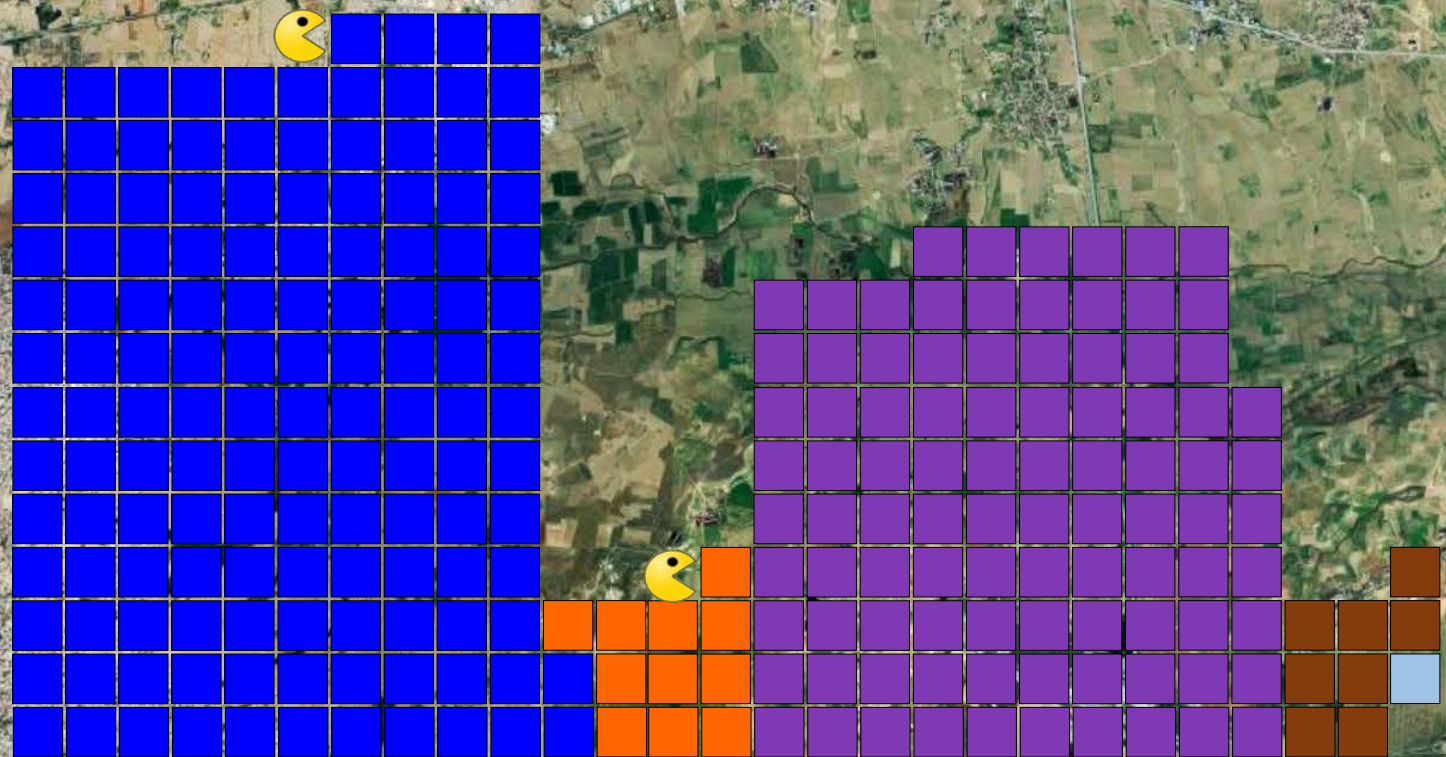
-6 GWh s&w electricity

+ 4 MWh electricity (CoP 4)



km 01 02

8







## RES HEAT SUPPLY

LT AQUIFER STORAGE + HEAT  
PUMPS

20% households

=

-15 GWh space & water heat

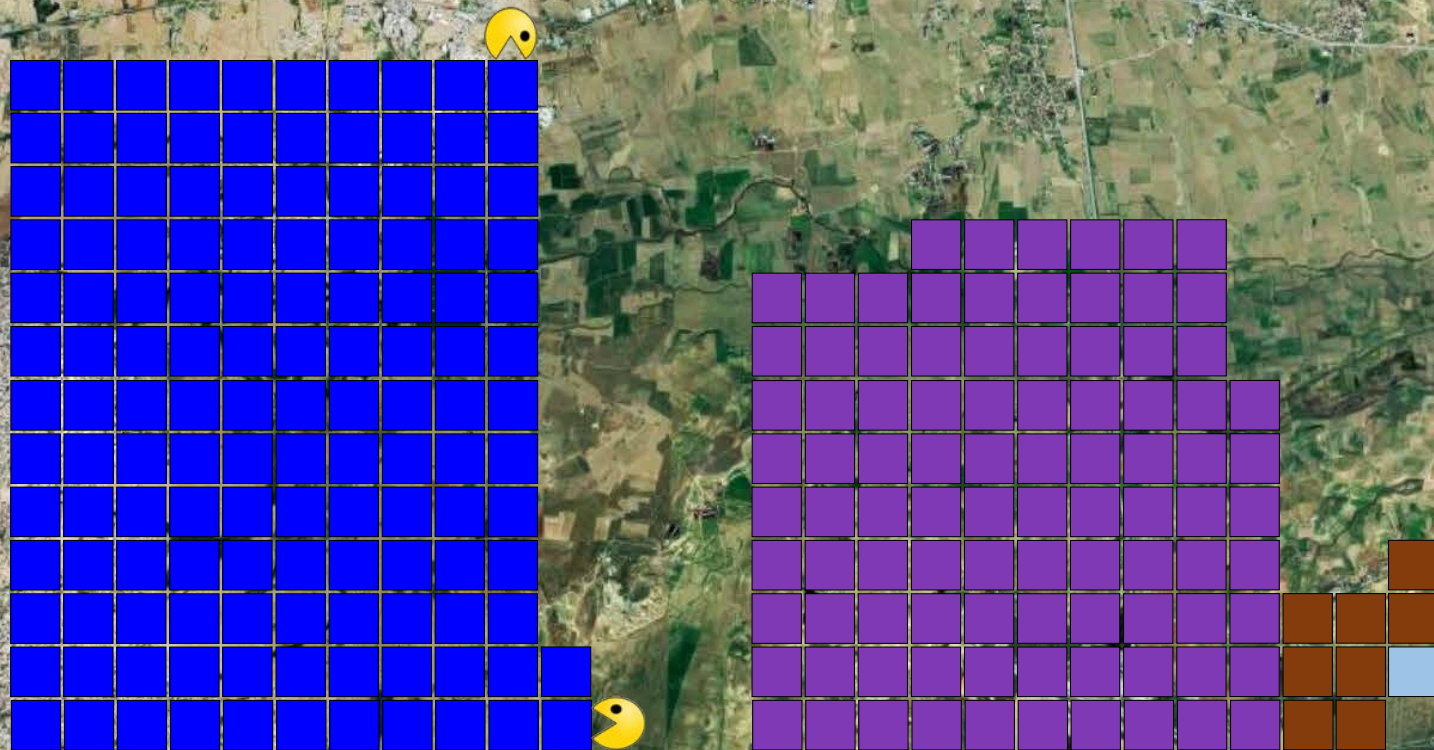
-6 GWh s&w electricity

+ 4 MWh electricity (CoP 4)



km 01 02

9







## RES ELECTRICITY

PV ON ROOFS + BATTERIES

60% households

52 GWh electric generation  
(174,000 m<sup>2</sup>)

Area ring = 1.54 km<sup>2</sup>

Total roof surface = 0.88 km<sup>2</sup>

Available ¼ PV roofs = 0.22 km<sup>2</sup>

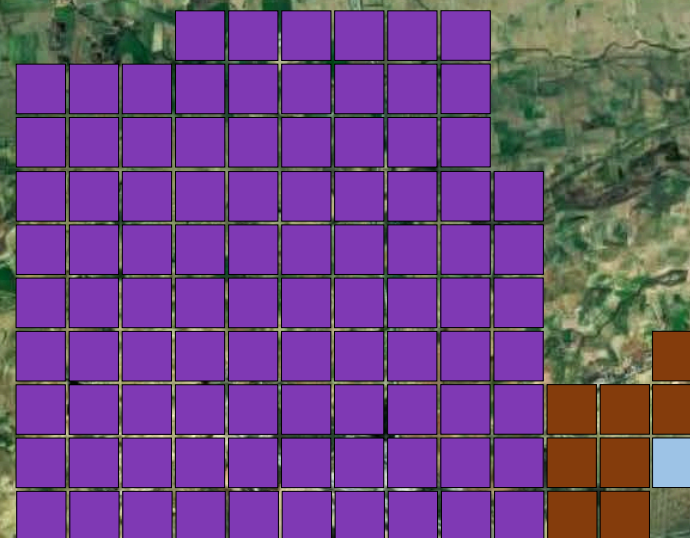
Avg 300 kWh/m<sup>2</sup> (includes loss)

Total PV potential = 66 GWh



km 01 02

10







## RES ELECTRICITY

Vertical PV

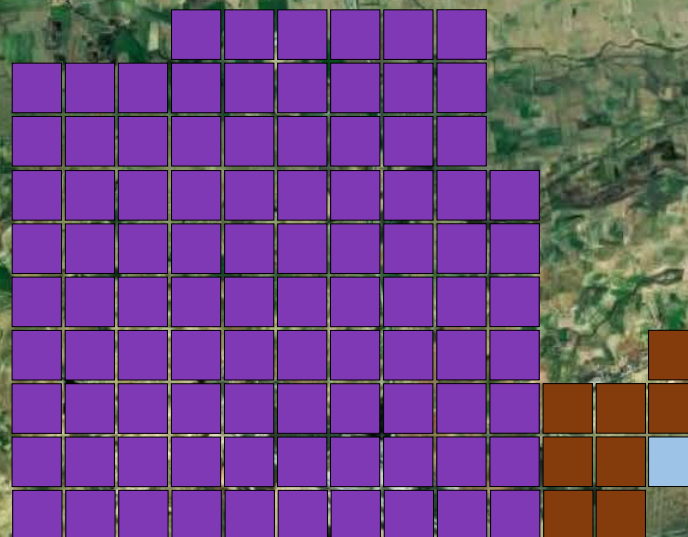
10% households

8 GWh electric generation



km 01 02

11







## TRANSITION TO ELECTRIC MOBILITY

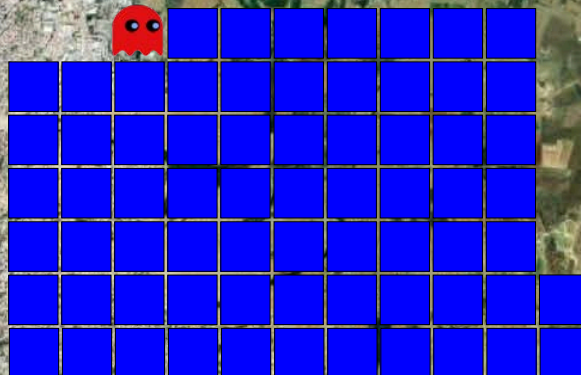
100% cars

32 GWh increased electricity

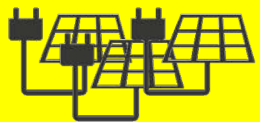


km 01 02

12







## RES ELECTRICITY

### Shared PV (canopies)

32 GWh electric generation  
(107,000 m<sup>2</sup>)

e.g.

14 GWh on roofs

18 GWh on canopies



km 01 02

13







**URBAN FORESTRY  
CARBON UPTAKE**

**230 hectares forest**



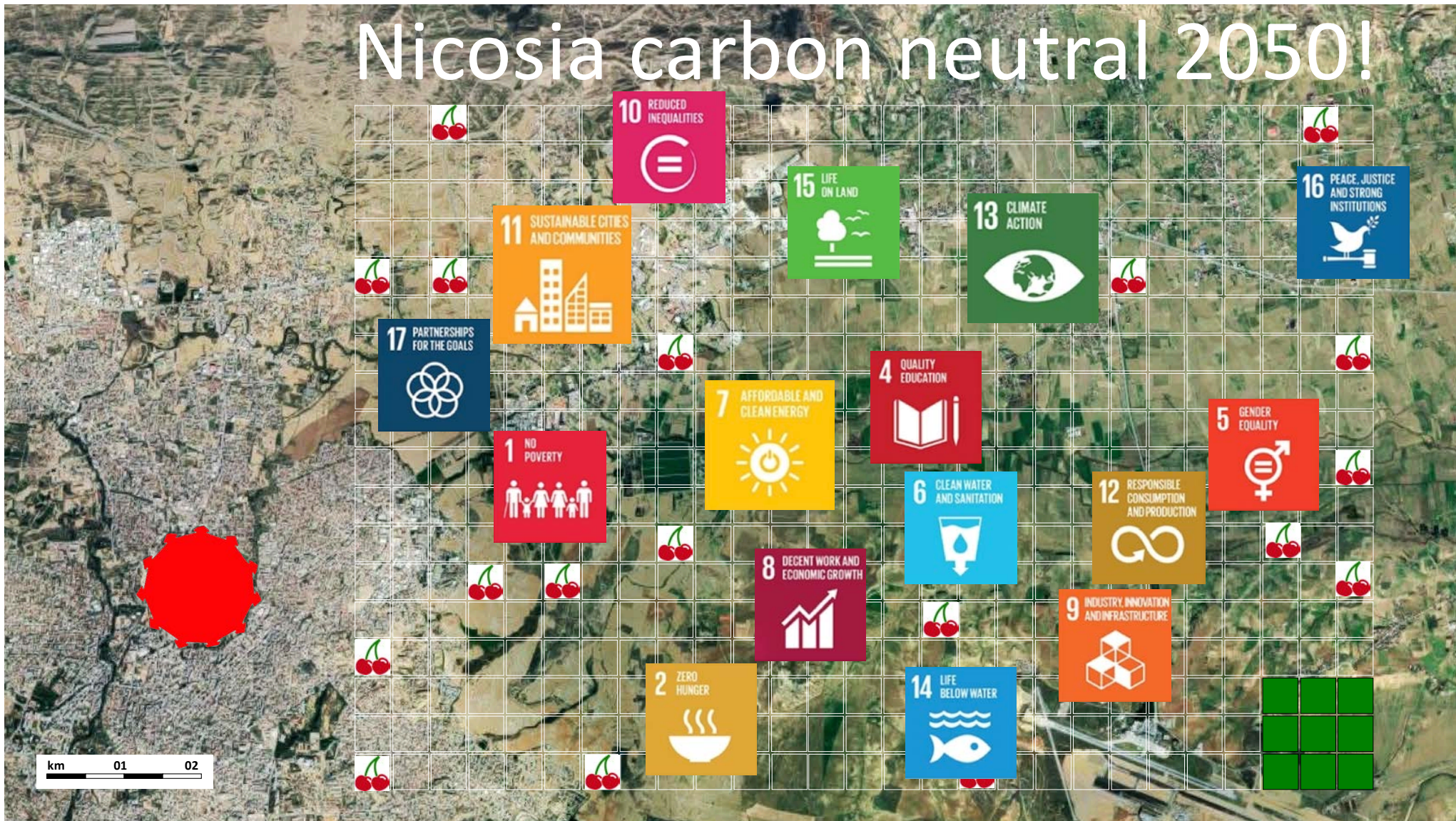
km 01 02

**14**





# Nicosia carbon neutral 2050!



# City-zen Nicosia Roadshow (May 8-15 2019)



Presentation by

**Prof.Dr. Craig Lee Martin**

City-zen Roadshow Leader

The Delft University of Technology (NL)  
The Grenfell-Baines Institute of Architecture, UCLan (UK)

## Roadshow Team:

Prof. Greg Keeffe (QUB)  
Prof.Dr. Andy vd Dobbelsteen (TUD)  
Dr. Riccardo Pulselli (UoS)  
Prof.Dr. Craig L.Martin (TU Delft)  
Prof.Dr. Han Vandevyvere (VITO)  
Dr. Andy Jenkins (QUB)  
Dr. Markella Menikou (UoN)  
Anneleen Vanderlinden (Th!nk-e)  
Achille Hannoset (Th!nk-e)  
Maryam Al-Irhayim (UCLan)  
Emma Campbell (QUB)  
Sam van Hooff (TU Delft)  
Rainer Townend (UCLan)  
Alexis Postekkis (UoN Alumni)  
Andreas Prokopiou (UoN Alumni)  
Christos Xenofontos (UoN Alumni)

This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 608702

